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INTERACTIONS OF TECHNOLOGY AND SOCIETY

**Impacts of Improved Airtransport - A Study
of Airports at the Grass Roots**

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<p>16 Abstract This study has two purposes first, to test the feasibility of applying a particular conception of technology and social change to specific examples of technological development, and second, through the vehicle of this feasibility study, to examine the effects of improved airtransport capabilities upon rural areas In pursuit of these purposes, the concepts of technology and community dynamics were related closely together and then applied to an analysis of the Ohio County Airport Program Part I of this report presents a general conception of technology as a social system with particular reference to airtransportation Part II discusses the process of implementing a quite ambitious program directed by Ohio's Division of Aviation which resulted in the construction of some sixty smaller airports throughout the State of Ohio Factors which led to the success of the implementation phases of the program are examined Part III reports the results of a "field study" in which seven of the numerous communities adjacent to these new or greatly improved airports were studied Local airport officials, industrial users and recreational flyers were interviewed to determine the extent to which airport development has resulted in change within the communities Finally, Part IV explores some of the implications of our findings for public policy implementation, evaluation of airtransportation development and, more generally, the conduct of technology assessments.</p> <p>The feasibility aspects of this work demonstrated that the perspective of technology as a social system could very fruitfully be used as a guide to examining the impacts of technologies upon the regions into which they are introduced However, care must be taken in the method of applying this perspective The empirical portion of the study, in both its attention to the process of implementation and in its examination of the effects of the airport program on the communities involved, lead to the following general conclusions discussed in considerable detail First, the process of implementation resulted in widespread acceptance of the program in the relevant communities Second, while there was a remarkable diffusion of technology, e e , the dispersion of airports throughout Ohio, there has been only minimal social or economic change, Finally, an important reason for this diffusion without social disruption was that the manner of implementation, resulting in community acceptance and high levels of cooperation, also resulted subsequently in community control of developments which would have been required in addition to airport development for rapid economic changes to have taken place In most cases the communities did not want such changes and they did not</p>					
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PREFACE

Like many studies, this one which culminated in our exploration of the relationships between the Ohio County Airport Program and some of the communities to which it provided increased airtransport capacity does not stand alone as an isolated project. Rather it grew out of prior work concerned with more general matters of technology and social change and the impact of a particular technology--aircraft with a short-take-off-and-landing capability (STOL)--upon social life. The original impetus for this work came from Dr. Hans Mark, director of the Ames Research Center of the National Aeronautics and Space Administration. Convinced that complex technologies prompt social and political changes which are as difficult to understand and predict as they are sure in coming, Dr. Mark initiated conversations which resulted in the early work leading to this report.

Our initial effort, in the summer of 1971 was a brief, somewhat impressionistic reconnaissance over the terrain which we believed should be traversed in order to clarify the conceptual and methodological basis for increasing our understanding of the social impact of short-haul air transportation systems.

The basis for further work over the next year, this effort prompted us to pursue three broad and overlapping topics. First, we continued developing general conceptual notions linking technology as a social system to other elements in our social and political institutions. This work included a review of the adequacy of the social assumptions undergirding various approaches to technology assessment and of the assertions already available in various literatures concerning the effect of improved transportation capacities upon social and political experience. This line of inquiry linked up eventually with our field work in rural Ohio.

Interests in the social effects of technology led us to consider how various technological programs shape and evoke public sentiments. Thus, the second study area followed throughout 1972 was the attitudes of the general public toward present and potential technological development. In our efforts to develop a base-line to which subsequent studies could be compared, we discovered almost a complete absence of data. This signal deficiency prompted us to carry out what appears to be the first systematic regional survey of public attitudes of its kind. Preliminary findings were presented in Chapter III of our 1972 Progress Report to Ames Research Center and resulted in increased attention to this phase of our overall program.* In 1974 a second survey was conducted with supple-

* See below, p. 4, for materials in which we have already reported some of our survey findings.

mental support from the National Science Foundation. A final report on this project is scheduled to be completed in mid-summer 1975.

The third segment of our work during the intermediate stages of this project was an attempt to develop a clearer conceptual statement concerning the relationships between technological organizations and the regulatory process in the United States. Considerable progress was made in developing a framework for study of these interactions (see Chapter IV, 1972 *Progress Report*). The implications for further research, however, clearly demanded a level of effort that could not be mounted because the necessary depth of access into the regulatory agencies would have required much longer associations than could be assured. Regrettably this portion of the study had to be dropped.

The genesis of the particular research reported here was a combination of the encouragement we received for our general inclination to explore actual instances of increased air transportation activities and a clipping sent to us by Mr. William Harper of NASA-Ames. As a key adviser to Hans Mark, Bill had been privy to much of our work and when he discovered a short article on the Ohio County airport Program in the back pages of an aviation trade journal he sent it to us. Its contents prompted me to stop over in Columbus on a return trip from the east coast. That visit with the Ohio Division of Aviation and its Director, Norman Crabtree, started the train of events which later took us from Berkeley to rural Ohio during the hot and humid summer of 1973.

Even a short visit revealed that a good deal more was happening in Ohio than we had expected, it was clearly justified to make a much more intensive foray into the field than we had originally intended. But this would require the supplemental support needed to double our field staff. Through the good offices of Bill Harper, joined by Dr. Trieve Tanner, the group supervisor under whom our grant was administered, contacts were made with Dr. Lawrence Green of the office of the Secretary, Department of Transportation. Subsequent negotiations resulted in the funds needed to take up this unusual opportunity. Encouraging these proceedings, as well as the more usual grantee-grantor relations, was Mr. E. Gene Lyman, Director of NASA's Aeronautical Life Sciences Division in Washington, D. C., who has supported the project from its outset.

It is a pleasure to acknowledge the support and encouragement of these men. They have had the vision necessary to sustain an effort which was unusual and from which "findings" could not be assured at the beginning. They have been largely responsible for enabling an extraordinarily open and, at least from our view, most fruitful, relationship between a university group and a government laboratory. In this relationship, Dr. Hans Mark and Dr. Trieve Tanner have been central, each according to their respective roles. Hans Mark was always interested and probing, often suggesting promising implications for further research much in the academic style he had used so well in his days with the Department of Nuclear Engineering at the University of California. Trieve Tanner has followed the day-to-day developments of our several projects, as well as the more

strategic matters involved in arranging for supplemental support for one aspect of the program or another. During the several years of our relationship he has won our deep respect for the contributive spirit with which he approached our work and for his clear understanding of the conditions which enhance relationships between university researchers and governmental programs. Our keenly felt thanks to these men for assisting in sustaining an altogether positive relationship.

From the outset we have remained convinced that work investigating technology and social change requires interdisciplinary cooperation. This has meant that for the portions of the project leading up to and including the Ohio airport study a team approach has been employed. Thus a good deal of collaboration has taken place at almost every stage of the proceedings. Each member of the team has had extensive academic or professional experience in a technological area, the scope of that experience ranges from advanced academic work in Physics and Operations Research to experience in military aviation and computer-based Systems Analysis. In addition, the present preoccupations of team members range from La Porte's extensive research and teaching in Public Administration and Political Science to Edith Levine's interest in Anthropology and Folklore. Stuart Ross brought to the effort a background in the administration of scientific organizations and his present interests in technology and politics. Stephen Rosenthal was, during the research period, completing a Ph.D. in Planning. He has very recently taken up a position in the School of Management, Boston University. Kai Lee, now an Assistant Research Professor in the Social Management of Technology and in Political Science at the University of Washington, completed a two year post-doctoral program in the social sciences at Berkeley, after receiving his Ph.D. in Physics from Princeton University.

Also collaborative was the process of writing this report. This is especially true for the "community studies" in Part III. They were conducted by Rosenthal, Ross and Levine, with La Porte's supervision in the first community. Intensive discussion preceded almost every phase of community study. Generally initiated and organized by the senior author, these discussions afforded the opportunity for different perspectives and experience to inform the particular aspects of the study design, methodological decisions, and data collection and analysis. After preliminary discussions concerning the overall organization of the report, the actual writing involved the delegation to various team members of the task of developing initial drafts related to the topics in which they specialize. These drafts were then circulated among the team at large, comments noted and revisions made. The senior author completed the revision and editorial review for each chapter. The chapters so developed are noted so as to indicate the team member other than the senior author who had responsibility for contributing the material therein.

The pairs of introductory and concluding chapters (Parts I and IV) are the sole responsibility of the principal investigator, and I, of course, am solely responsible for the overall organization and conduct of the preparation and content of this report. A final note: the order

of authorship on the title page of this report reflects the respective team member's length and degree of involvement with the Ohio project. Rosenthal and Ross followed it through from beginning to end. Lee contributed periodically, with intensive involvement in Columbus, Ohio, charting the implementation phase of the Ohio County Airport Program. Edith Levine joined the field research team just prior to entering the field.

If a study such as this is to go forward without great error and avoid the thickets of a strange anthropology, the assistance of many people freely giving is essential. We were blessed in our associations with the generous, knowledgeable, and affable faculty and staff of the Departments of Rural Sociology and Agricultural Economics in the School of Agriculture of Ohio State University. These men proved to be invaluable sources of information, insight and guidance as we prepared to go forth to the "grass-roots." Professors Howard Phillips, Tom Stout and John Mitchell gave amply of their time and offered us a place to work during our visit. The specialized library in the School provided a most efficient collection detailing the economic and social complexion of the state. A particularly hearty thanks to "the two Al's," Al Gehres and Al Pugh, the coordinators of the community development activities for Ohio's Agricultural Extension Service. They graciously shared their remarkable insight and understanding of rural Ohio in a way which reflected their deep love of the state and its people. Complementing each other's knowledge and experience, they symbolized for us the good common sense and integrity of the people we were to meet, and they remain for me the very models of fine Extension men everywhere.

A very special acknowledgement must go to two principals of the piece, Norman Crabtree and John Cornett, the Director and Assistant Director respectively of the Division of Aviation. Their cooperation in this study was essential, forthcoming and given with gusto. A good deal more will be said of these men and their approach to the challenges and problems of "sowing" airports across the rural counties of Ohio. Suffice it to say here that I am personally most grateful for the spirit of their assistance to us and for the enthusiasm they both display in the conduct of public work. Would that there were many more like these energetic men to carry on the public's business.

In addition to those who have contributed directly to this monograph, others from the university community have informed the particulars of this study. I am delighted to acknowledge the contributions and contributors from the University of California, Berkeley. Bayard Catron, Neil Mayer, Ira Kurzban, John Forester, Dane Miller, and Daniel Metlay all have added to the conceptual and methodological contexts of this monograph through their work on the two prior reports. The staff of the Institute of Governmental Studies has provided assistance in the everyday life of a research program in ways almost beyond mention. Especially helpful have been Joan Barulich, Catherine Winter, Linda Harris, and Kathy Gura in various aspects of grant administration and report preparation.

Interdisciplinary work creates interesting problems of reporting. It brings together people who have been trained in different ways of framing materials and ideas. Hazards of mismatched style and presentation are rather greater than when a project stays within the less disparate (often less fruitful) conventions of a particular discipline. We are indebted and most thankful for the very able assistance of Mary Fenneman, who with great skill and some patience has attempted to reduce the variations of style, the unintended ambiguities, and the confusions of internal logic that such a mix of disciplinary backgrounds as those represented in this report can produce. My particular thanks for her concern for the project and her professional approach to what has been a formidable editorial task.

Todd R. La Porte
Principal Investigator

PART I

AN OPPORTUNITY IN TECHNOLOGY ASSESSMENT: TECHNOLOGY AS SOURCE AND OBJECT OF SOCIAL CHANGE, A CONCEPTION OF TECHNOLOGY AS A SOCIAL SYSTEM, AND THE CASE OF NEW AIRTRANSPORT CAPACITY

As the United States and, increasingly, other advanced industrial nations peer into the future, many of the proposals for dealing with the changes ahead are based on an abiding faith in the utility of technology and in our capacities to use new or improved technical inventions in the service of mankind. Yet at the same time there are growing numbers of leaders and members of the informed public who have become wary of the assumption that such faith is automatically rewarded only with benefits. There is sufficient evidence from the accumulated effects of past technical development to warn us of the dangers of that simple faith. Grim and unpleasant surprise too often accompany it. It behooves both the inventors and evaluators of new technical ventures to examine the conditions under which such ventures will return desired effects in both the shorter and longer term. For technical efforts in transportation, in providing energy, and in extending communications capabilities, all of which are likely to be quite widespread and to hinge on large organizational systems for their implementation such caution is particularly necessary.

Any effort to address the difficulties of using technology in the solution of commonly recognized problems rests fundamentally on the quality of knowledge about the effects of technical development on the way men and women experience their world. This assertion is the basis for the central question that has guided our work:

*What about technological development makes a difference
in the economic, social and political experiences of
consumers and citizens?*

Broadly, this question hinges on the relationship of technology to social change. To the degree our knowledge of these relationships improves, to that degree will policies for technical development in the future escape judgments rooted solely in the intuitive "common sense" soil of the past. Such an escape is clearly necessary, for there is little reason to suppose that past experience can afford us much more than the warning that we should expect consequences beyond those which "common sense" can predict. Intuition may be a suitable basis for vague indications of problems lying ahead, but it is grossly inadequate for the development of solutions.

Our central question, then, leads to two others directly related to public policy. First, what do we need to know to make a sensible socio-political assessment of a technology or complex of technologies? Second, what do we need to know to create and design new or improved technologies so that they provide necessary new capabilities and more desirable longer-term social effects than those we have experienced to date? On the face of it, the most reasonable initial step in answering these questions is to review what is known about the various aspects of a technology's design and its effects on personal experience. Such a review is sensible in approaching any exercise in technology assessment. It is, in a sense, the basis both for more accurate knowledge informing policy choices and for determining the kinds of new knowledge necessary in order to improve those choices.

In this study, for reasons both of research economy and the source of our support, we limited the scope of our work to one technological area--transportation--and within it to one specific mode, airtransport. Narrowing the problem focus made it possible to emphasize the developmental character of the project and to work out its methodological implications in an empirical field study. At the outset, the search of the literature covering the complexes of transportation technology showed remarkably limited results. Whether from the material directly related to transportation planning and the economics of transportation or from the more general material from the social sciences, very little assistance is to be found in answering questions concerning the impact of transportation technologies upon social and political experience. The literature, on its face, is spread so disparately over many areas that insights do not readily emerge.

Some order and insight can be gained, however, when a sociological perspective is used to inform our analysis. Some of the following relationships between transportation and social experience are relatively well known; others may seem to add complementary notions to what is common sense.*

1. Transport development stimulates the reallocation of physical resources and the disturbance of the physical environment. Through the use of raw materials and the consumption of land for railbeds, roads, etc., and the production of waste products, expanding transportation systems alter the possibilities of land use and commit society to look after the social consequences of pollution.

2. The social organization necessary for the production and distribution of new transportation capabilities has been a strong impetus for social change. This has included the change of work conditions in mass production factories, the need for new skills and the displacement of others, and the exploitation of workers in the past.

* Based on work done by John Forester and Stephen Rosenthal for IGS NASA Progress Report, 1972, Ch. 2.

3. Closely related to the impacts of transportation organization is the *substitution of a new transportation capacity for an older one* for accomplishing activities and functions. Thus motorized transport has replaced the horse drawn wagon, and trucks take away demands for freight by rail, etc. This extends to the substitution of one land use for another, from elevated tracks to underground subways. In the wake of such substitutions comes the almost inevitable displacement of occupations and the disruption of economic relationships.
4. As the sweep and speed of transportation capacities increase, *definitions of social space also change*. The attractiveness of once remote areas increases as the cost of getting there declines. Wide access to new lands often works to alter a community's definition of itself in relationship to neighboring areas now more accessible.
5. As both the physical and social accessibility to widening areas increases, *patterns of interaction spread and intensify*, thereby creating more complex social relationships. This increased complexity can be seen in the increasing interdependence of social, economic and political units, the increased technological and social dependency one unit may begin to have upon another, and an increase in the specialization of economic and political functions performed by one unit for another.
6. Transportation developments are not, of course, received blandly by all groups in a community or a society. There are *organized social responses to prospective and actual improvements in transportation capabilities*. Some groups organize in support of an innovative transportation development; others gather in opposition to it. These groups follow the course consistent with their own interests. Some of these groups serve to integrate like-minded people across a nation, others to mobilize local support or opposition. Frequently they enter into the process of political decision making, vying for advantage in pursuit of or in protecting of firmly held values.
7. Partly as a consequence of such organized citizen and/or commercial effort, *government intervention has been crucial in the development or blunting of transportation capabilities*. Government subsidies for construction, political support for advantageous rate structures and government sanctioned settlement of disputes between operators and users have long been a part of transportation developments in advanced industrial countries. And government regulation and advocacy has been central, perhaps imperative, for rapid developments of various modes of transportation.

8. Finally, the culmination of many of these lesser included effects results in perceptible *changes in social values and patterns of behavior* evinced by the groups subject to improved transportation capacity. These broad social effects range from the erosion of primitive values and cultures to changes in personal sexual mores in more modern situations. There is evidence that transportation-triggered changes in the pursuit of economic advantages have altered deeply held beliefs about self, community, and culture. This has been particularly evident in rural cultures and sub-cultures, but it can also be seen in the more recent changes in attitudes toward freeway construction and automobile pollution.

The consequences just outlined, treated in the literature and often confirmed by actual experience, give scant assistance in refining the conceptions of transportation technology so that new systems may be designed to ensure more positive social effects. Faced with this situation, we were obliged to go beyond the literature in addressing the questions posed earlier on. This report is a partial result of that effort.* Part I presents a general conception of technology in terms we believe will enable researchers to develop a more coherent understanding of the relationship between technology and social and political experience. This perspective is cast within the particular context of airtransport and is based on a view of technology as a social system. It draws upon concept and methodologies in the social sciences--particularly sociology, political science, and organizational dynamics.

Parts II and III report the results of an exploratory field study of the Ohio County Airport Program. Ohio's Division of Aviation's program was, in effect, a "natural experiment" in the improvement of airtransport capabilities. The field study was essentially an attempt to demonstrate the utility of the conceptions developed in Part I for designing and executing an empirical study of the impact of improved airtransport upon small communities. We believe that the demonstration was successful and that the underlying perspective and methodology can be applied to much larger airtransport systems, to other types of transport, and to different large scale technologies as well. Part IV then extends the implications of the notions in Part I and the empirical

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The other effort, conducted in parallel to this study, has been an attempt to gain a systematic understanding of public attitudes toward advanced technologies and the institutions associated with them. Initial results of this work are reported in T. La Porte, D. Metlay, "Technology Observed: Attitudes of a Wary Public," *Science*, Feb., 1975 and "Public Attitudes Toward Present and Future Technologies: Satisfactions and Apprehensions", University of California, Berkeley, Institute of Governmental Studies, Working Paper Number 11, September, 1974.

findings in Parts II and III into the realm of policy, first by evaluating the policy implementation aspect of the Ohio County Airport Program itself and our attempt to incorporate it into an approach to technology assessment and then by venturing some speculation and interpretations regarding general policy for technology assessment as a function of governmental bodies.

CHAPTER ONE

TECHNOLOGY AS SOURCE

For at least the past one hundred and fifty years the economic and political patterns of the American culture have been shaped in part by rapid and virtually unbridled technological development. The invention of new tools which can alter our physical environment and new processes of production and agriculture have been received with general enthusiasm, their use subjected to relatively little restraint.¹ Among the most important technological developments in the growth of economic strength have been those associated with transportation. The development, in rapid succession, of regional canal systems and toll roads, wagon routes, steamships, railroads, and automobile and air transportation have had extraordinary effects on the character and pattern of life in this country.² These transportation technologies and the organizations required for their construction and operation have been, it seems fair to say, absolutely necessary, if not sufficient, factors in our remarkable history of sustained growth and expansion across the continent.

Only within the past two decades or so has there been uneasiness about either the shorter or longer term consequences of large scale technological development. The problems of "opportunity costs" in the short run have arisen. These are situations in which opportunities must be foregone because scarce resources have been allocated to a particular technological development and exhausted funds which might have been used for other technical programs or invested in other types of desired programs. The manner in which new and improved technical ventures are organized generally prompts each advance in a technological area to be successively larger in investment, requiring more and/or larger systems of machines and facilities, and more personnel for operation and construction.³ When each new technical opportunity seems to imply a large

scale enterprise but resources are limited, then the problem of choosing one from among several alternatives must be confronted. Reliable information about the consequences of one technical venture as opposed to another becomes more necessary as the size of technological projects mounts.

In addition to short-term opportunity costs, officials (and, increasingly, members of the public) have become ever more painfully aware that many of the accumulated longer term effects of technological developments are surprising, unpleasant, costly and perhaps irreversible. These effects are seen in various kinds of pollution (air, water, noise, and visual), resource exhaustion and other forms of environmental destruction, and in social dislocation and changes. Intuitively at least, it seems clear that many of the penalties exacted, in the long-term, for technical progress are not borne by those who benefit either from direct production or direct use of the technological capacity. Rather, these costs seem to be borne most often by the public-at-large, and quite likely by generations still to come. In a sense, the users of today's technology are incurring a debt to be paid off by those in the future who will derive no direct benefit from today's use. Such inherited penalties or costs are now being recognized and seen to reduce the apparent net beneficial effects of technical developments.⁴ Determining such costs (termed "externalities" by many economists) is exceedingly important. It is also exceedingly difficult, for we have neither adequate conceptual language nor methodology for such a task.

In matters of public policy formulation and implementation, transportation technologies are prime candidates for concern both in the short and longer term. In order to be effective, transportation systems of almost any kind are likely to require substantial investments in large and/or numerous machines. They are likely to be established to serve at minimum a fairly large metropolitan area; hence heavy investment in road beds, track, highways, airports, or harbors is also required. The immediate costs are a great drain on resources, the opportunity costs are high, and the sheer scale of transportation systems is likely to effect changes which for all intents and purposes are irreversible--

physically, in the often dramatic changes of the environment, and socially, in the behavior patterns of consumers and citizens. Miles of concrete freeways and the almost unlimited range of social uses of travel prompted by the automobile, for example, have profoundly affected both the external environment and the character of the people who inhabit it.

As the cause of public mass transit grows, moreover, it seems clear that the financial relationship between transit authorities and other governmental authorities will be permanently affected as well. It is unlikely that any new form of transportation will ever be able to operate on a "pay-as-you-go" basis.⁵ Subsidy in some form is likely to be necessary into the distant future.

If long-distance passengers and freight are to be delivered nearer central city districts and/or to rather remote regions, those contingencies particularly describe the case of *airtransport*. The technical work necessary to advance such possibilities is now underway. Its possible success has prompted this study and will remain the touchstone of our efforts.

"Large Airplanes that Can Fly Slow" and the Confusions of Technological Assessment

Those most closely associated with the developments of aircraft technology believe it will be technically feasible within the next decade for very flexible, high performance short-haul transport aircraft to be operating between the many hundreds of small and medium-sized airports in this country. To this end, considerable effort has been made to develop the technology which would permit high speed jet aircraft carrying relatively heavy loads to land at slow speeds. It is sensible to imagine that in the near future air travel of this kind could be widely practiced across this continent and perhaps throughout less developed countries in Asia, Africa, and Latin America. Thus, through the support of this technical development, the federal government is a party to economic and political decisions which could bring about a remarkable increase in the degree of physical mobility within the United States and elsewhere.

Optimistic observers envision the transport of people and materiel from central city to central city, with aircraft descending almost vertically onto short airfields perched over existing freeways. Others see the use of such aircraft in the opening of rural America to industrial activity. Also imagined are specially outfitted aircraft capable of rapid emergency evacuation, delivery of medical and dental services to remote areas, and excursion aircraft for use in recreation spots. Skeptics, on the other hand, see an invasion of wilderness lands by multitudes of polluting tourists and the public subsidy of airlines to remote outdoor playgrounds frequented only by the affluent. They also see greater congestion of urban airspace, steeply increased noise pollution and other heavy public costs associated with population growth and public transportation.

It is possible to imagine all of these outcomes, some mixture of them, or none of them. A great deal will depend on the technical inventiveness of aircraft designers and engineers, on legislative skill in developing public policies for the utilization of this new technical capability, and on the general public's response to its development. Unfortunately, decision makers and the public are confronted by grossly inadequate information about technical possibilities, the consequences of actually carrying out a transport system based on such short-take-off-and-landing (STOL) aircraft, and about the effectiveness of government regulation in directing such development.

Without demonstration here, we shall assert that the review of literature apparently related to technology and social change provides us with little of direct value in increasing the quality of concept or methodology for examining the impact of airtransport (or any technology) upon future social and political experience.⁶ Discussion about matters related to technology's consequences is frequently cast in a truncated and unbalanced language. Thus far the language of policy consideration and evaluation in this area has been based predominantly upon various dialects of engineering and science covered with a veneer of "common sense" and the apparent precision of cost-benefit terminology. These are the vocabularies which engineers have developed and tested in their world of technical prototypes and inanimate objects.

This technical language has reached a remarkable degree of logical and mathematical precision. It contains refinements so powerful and precise that, provided with sufficient organizational and political resources, technologists reduce the impossible to the commonplace. Thus, this nation has come to witness space flight as ordinary and to await with little awe the widespread nuclear generation of energy. Similarly, we turn with great hope to technical innovation to assist us in moving about large urban areas with relative ease, getting to remote rural regions and traversing continents in a flash. There is admirably adequate language and knowledge bases for the construction and operation of vast machineries and remarkable new buildings and plant facilities required for these transportation goals. Two examples illustrate this situation, the first from a sample of the feasibility reports done in the analysis of STOL-based transport, the other from a report reviewing the methodologies of technology assessment more generally.

Even a cursory look at the feasibility studies of short-haul air-transportation show a well developed language of the technical capacities of different aircraft designs, their lift capacities, engine performance and landing configurations, and noise footprints as well as the economics of aircraft productions, potential costs per passenger mile, etc.⁷ But as questions come to the reader's mind about the degree to which various routing patterns will stimulate demand, alter local employment patterns, or result in drains or benefits to local communities, he will find little to inform his search for answers or even to indicate that such effects have been considered. Detailed assistance in understanding the wider effects of STOL-based short haul transportation is simply not provided. By and large such feasibility studies are limited to economic aspects of a new technology and focus mainly upon the likely costs of production and the degree to which current levels of use could be expected to return revenues resulting in acceptable air industry profits. These are important questions, but they provide almost none of the complementary information needed to assess many of the likely consequences of improved airtransport technology.

Another example of the imbalance in technological language is revealed in an elaborate report summarizing the "state-of-the-art" of technology assessment.⁸ In this report the MITRE Corporation proposes an elaborate seven step "process of inquiry" for assessment tasks. Essentially, this scheme suggests that analysts fill out tables of "relevant" information outlined in the report. The illustrative tables and accompanying discussion provide a language for naming data to be gathered and a set of categories for itemizing it. Areas of inquiry are mapped and types of data to be collected are identified, but unfortunately the MITRE methodology stops there. Once the data has been gathered and assembled, there is almost no discussion of the mechanisms for linking the data together in meaningful ways. Technology assessment, at least as summarized by this report, appears to have little conceptual substance or any rationale for nominating or ordering "impacts" deemed significant. Here is an example of the engineer's methodology transferred to the area of social effects. But in any area in which there is no agreed upon underlying theory of causation (the case when confronting physical and, to some extent, biological phenomena) such a "methodological transfer" without explicit inclusion of underlying theoretical assumptions is very hazardous. Without providing substantive concepts about the working of the social world, MITRE counsels the use of intuition and a trust in experts. This may be necessary, but it is hardly trustworthy in the face of the complexity and uncertainties of future techno-social systems.

In its present form the language of technology as it is applied to the assessment or evaluation of airtransport technologies, transportation technologies in general, or for that matter to any technological area, is productive mainly of three related confusions which are the source of considerable error in research, planning and policy analysis. The first is a confusion arising from the meaning of the generic term "technology." The second is a confusion stemming from a muddled and far too simplistic sense of the social properties of various technological devices and their related physical structures. And finally, there are those confusions which result from the application of often contradictory criteria or values, mingled with inappropriate "policy analysis

techniques," to different technologies treated as if they were quite similar in design and consequence. In this chapter an attempt will be made to reduce two of these confusions in general terms and, for illustrative purposes, also in terms of potential air transport systems based on the Short-Take-Off-and-Landing aircraft capability. The third confusion is addressed in Part IV below.

TECHNOLOGY IN AN EXPANDED VIEW

Technological assessment, technology and social change, and public policy for technology necessarily begin, at least implicitly, with *technology*. Technology becomes the point of origin, the source of initial and often ultimate concern. But what is often indicated as "technology" is, as well, the course of our initial confusion. This term has come to symbolize a staggeringly wide range of generally undifferentiated phenomena. "Technology" is used to denote an enormous variety of devices and physical structures on the one hand, and a way of thinking about the dynamics of the physical world on the other, enabling us to change that world. And "technological" has also been used to characterize the sort of social and cultural ethos in which we live. Thus there is a mixed and generally confused meaning of the notion as it is used in common speech. The language of policy analysis takes that confusion further. Any concept which encompasses a wide range of undifferentiated notions is a fundamental handicap in developing more accurate and reliable analyses. A more refined notion of technology is absolutely necessary if we are to emerge from confusion.⁹

It is clear at least that "technology" means a system of ideas and concepts which are the basis for machine prototypes, the buildings of the modern era, and the organization of work whereby the physical world can be altered. This conception of technology, as the application of scientific principles to the solution of socially defined problems, is most often used. Its meaning is the most fundamental and limited and is one held in common by engineers and technical administrators, architects and builders as they attempt, through flight, rapid ground travel,

healing and housing, to transcend man's limitations.¹⁰ The results of such application leads to an important distinction between classes of *technologies as physical objects*: The distinction between the *machines* which enhance and encumber our lives and the physical *structures* within which we live and work and house the productive and monitoring machines of our culture.¹¹ Such a distinction is necessary especially in considerations of social analysis and public policy, if we are to avoid treating television sets and roads, kidney machines and nuclear reactors, computers and shopping centers, and aircraft and airports as if they had similar systemic properties. While the underlying logic derived from the laws of the physical world does not suggest this distinction, it seems clear that machines and structures are likely to have quite different social and political properties. Treating them as if they did not is one source of error common to the few technology assessments available. This distinction will play a major part in the development of the policy implications of the airport study reported in Parts II and III. It is, in a sense, a counter to the overwhelming machine bias in almost all of the discussion about technology and public policy.

It is useful also to make another distinction--of *technology as an analytical process*. The processes of technical integration and coordination devised by industrial engineers and systems designers which build on the intrinsic operational logic of the technology as machine or structure are inextricable from that machine or structure. They lay out, often in intricate detail, the imperative relationships of one machine to another and the standard operating procedures necessary if the technology is to fulfill its technical promise. Each of these qualities of "technology" signals different potential social consequences.

In developing a conception of technology that will facilitate improved social and political forecasting as well as improved technical design for social purposes, something else besides the concepts, physical laws, prototypes, and analytical processes must be taken into consideration. While citizens and statesmen, consumers and politicians, also hold the notion of technology-as-concept, they experience technology, in its different aspects, as social experience as well. Beyond

the external physical changes wrought by technological advance, changes occur in people's ability and capacity to do things--to change the shape of social life itself. These are the changes, generally widespread, that stimulate both the enthusiasm and the uneasiness about technical development. And they are the changes which require the active cooperation of many people to accomplish. Thus, it is essential to understand that "technology" is also a system of human beings cooperating in quite complex ways, ways combining to create a new or improved capacity which others may use to alter their life's experiences.

The social promise of technical ideas, machine prototype, or architectural design goes unrealized unless groups of people cooperate in pursuing the means and the organization necessary for delivering that promise to others. For our purposes this means that engineers, managers, technicians, secretaries, etc., are involved in acting out the cognitive ideas of a technology so that its capabilities become widely available. Thus, *technology-as-organization* can be seen as a system of cooperative relationships among those people who actually make available that which is potentially promising in concept, prototype and analytical process. The systems of cooperative action includes those which produce the technical outputs and services and often the firms which contribute both materials and trained personnel to the producing and distributing organizations. For technologies to be assessed so that desired changes may be insured or for technological design to become the focus for demands that desired social values be enhanced requires changes in the activities and thinking of the men and women who cooperate together in turning technical potentiality into actuality.

Figure 1-1 schematically summarizes the perspective developed thus far. We argue that "technology" can fruitfully be understood as a complex human phenomenon which includes the following: (1) the *cognitive theory and creative ideas* that technical professionals--engineers, architects, physicians--use to fashion (2) *prototypes of machines and structures and to devise analytical processes*, and (3) the *organizations of those who produce and distribute technical capacities* to citizens and

consumers. In combination, these essentials provide different ways of organizing to produce and distribute a technical capacity and the foundation for systematic development of the social properties of different types of technology. Without such a development it will remain the task of intuitive guesswork to determine which activities must be altered, and in which manner, if technologies are to be designed more nearly to enhance the possibility of desirable social and political conditions. It is the first step to acquiring the knowledge upon which social *affirmation* of a technology may be built into its design--rather than its negative consequences merely controlled after the fact.

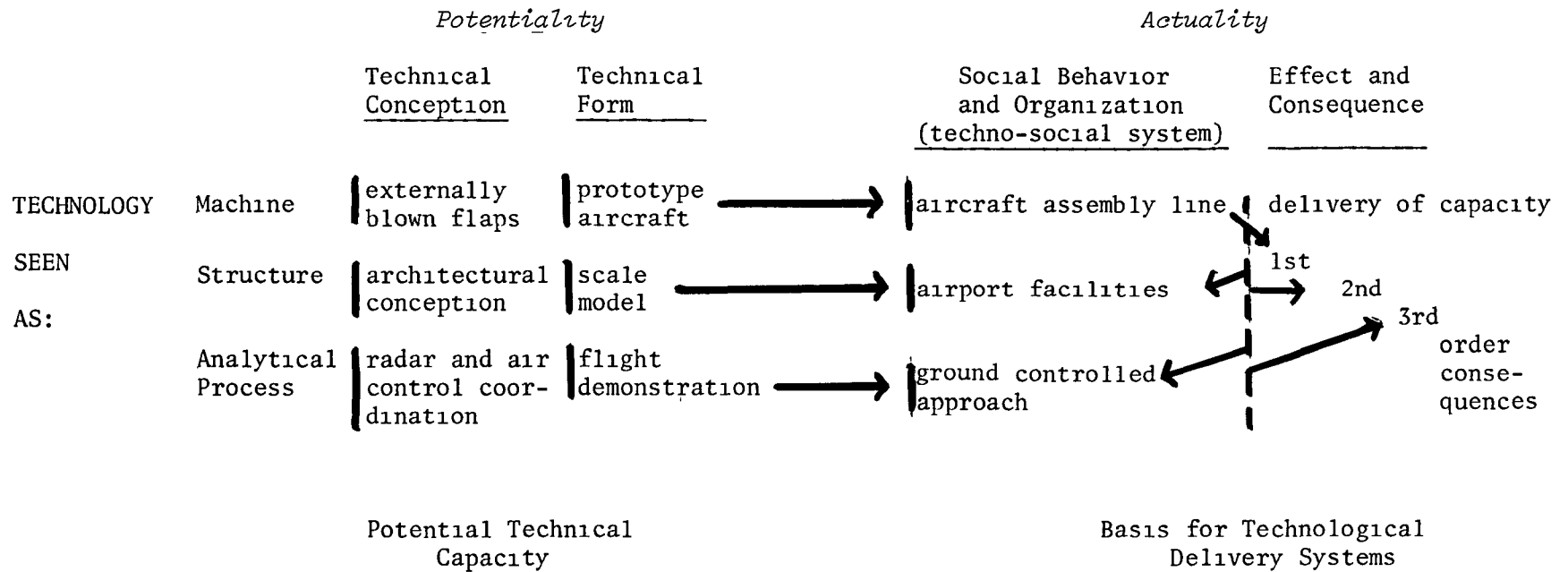
Airplanes and Airports: Illustrations for Explication

For purposes of illustration, we now ask how a conception of air transportation would be expanded using the notions depicted in Figure 1-1. Because the complexity of the U.S. air transportation systems is so great, we shall narrow the discussion somewhat by dealing with (1) aircraft having STOL characteristics, (2) airports constructed to receive such aircraft, and (3) the air traffic control processes which have been developed to coordinate one phase of air transport activities. These three elements represent, respectively, the machines, structures and analytical processes distinguished above. Moving horizontally across Figure 1-1 these elements can be seen to ramify in the following manner:

STOL aircraft require the capability of decelerating safely to flight speed low enough that the space required either for take-off or for landing is relatively short, say from 1,000 to 2,500 feet of runway. This requirement may be as long as 4,000 feet for intermediate STOL aircraft. Thus, there must be a technical capacity to improve the lift generated by the aircraft wings at slow speeds. To deliver this technical capacity concepts of boundary layer control, the augmentor wing, externally blown flaps, and other configurations which facilitate slow flight with relatively heavy payloads have been developed.¹² The *technical form* of such conceptions are found in the various prototypes,

FIGURE 1-1
TECHNOLOGY IN AN EXTENDED VIEW

TECHNOLOGY AS



such as the early Bell X-14, used in testing the actual feasibility of the concept. Some of these machines can be seen in the experimental hangars of NASA's Ames Research Center in California. Once the concept has been "proven out" in prototype aircraft and found technically and economically feasible, production and distribution of STOL aircraft can begin. Production will involve the licensing of the producing organization, such as the De Havilland, and the subsequent sale to airline companies or public organizations which in operating the aircraft, will deliver the capacity to citizens and consumers. Suffice it for now to say that the way these organizations implement the STOL aircraft in operational terms is a key direct link between the technology-as-machine and technology-as-social-experience. And the behavior of these producing and distributing organizations vis-à-vis governmental agencies charged with regulating air transportation activities is an important link between the technology and the citizen.

The physical structures necessary to provide the airtransport capability--the airports or STOLports designed to receive aircraft that can land in short spaces--may be considered in much the same way as we have just considered the machines. These structures represent the static (i.e. fixed and relatively permanent) property of airtransport capability as compared to its dynamic aircraft. The conception of an airport need not be a radically innovative one like the huge Dallas International Airport or like proposals for STOLports perched atop major freeway arteries.¹³ But in each case considerations enter regarding the particular topographical situation, the particular configuration of space and location in relationship to other transportation modes and population, etc. In a sense each newly projected airport presents conceptual problems peculiar to its location, their solutions are embodied in the special design presented in the architectural plans and models used to enlist support.

When these plans and models are translated into actual structures, some of the major differences between machines and structures becomes apparent. The producing organization of machines are continuous organizations lasting for some time and operated to mass produce aircraft. But the producing organizations of airports are those relatively short

term combinations of construction firms involved in building runways and the adjacent structures. Once an airport is completed the producing organization for that technology-as-structure dissolves. It is not their main task to develop a work process for the mass production of airports. And the distribution of the airport capacity is quite different from that of our machine example, STOL aircraft. Aircraft go to where the need is, they are mobile; the airport draws in those who have a need, it is static. The operational requirements of an airport also are vastly different from the operational characteristics of the STOL aircraft. Yet both aircraft and airport--machine and structure--are technologies and both include groups and organizations which are the basis for the social impact of technology upon others.

Finally, the often intricate and complex procedures of air traffic control which coordinate the use of airports by aircraft operators must be considered in our typology. Dependent upon machines and structures of their own, the Air Traffic Control groups of large, heavily trafficked airports, on one hand, and the single operator of small remote airfields on the other, provide at each terminus a system of rules and procedures that assist pilots to negotiate bad weather and avoid other aircraft so they can navigate safely to the end of the runway at a conventional airport or a STOLport. At the most technically complex and sophisticated level air traffic control involves the technical concepts of radar controlled, sometimes automatic, landing systems, the demonstration of the feasibility of such procedures, and, finally, the development of a cadre of skilled radar operators and airport tower communicators. Again, here is an infrastructure of men and women who bring life to a technical capacity and who provide the direct and indirect link to citizens and consumers. Within the past several years we have seen their indirect effect as air traffic controllers have virtually shut down airport and airline operations through work stoppages.

To be sure, each of the components of airtransport technology we have discussed is itself made up of a number of sub-technologies, truckers for refueling aircraft, radio operators, maintenance men, sometimes security patrols, and often repair facilities and snow removal

teams. Each of these sub-technologies could be subjected to the same type of discussion. But perhaps the point is clear that there are ways of refining the concept of "technology" through the notions discussed above. It should also be clear that if technology is thought of only in terms of the concepts and technical forms it takes, and allows the organizational aspects of widespread delivery of technical capacity to remain vague and unsystematic, precision in analyzing its social impact is not likely. It is very important, then, to consider the properties of both the new or improved capacities that a particular technological system delivers to citizens and consumers *and* the properties of the implicated producing and distributing organizations. The next section attempts to extend the discussion to ramifications of those aspects.

Technology as Source and Stimulus

An expanded view of technology is only one of several steps necessary for a usable conception of the *interactions* between technology and society. Also necessary is a perspective which links technology-as-organization quite directly to the experiences of the public, organized groups, elected political bodies, administrative organizations, and, finally back to the technologists themselves. This requires a basic notion of the underlying dynamics of social change and the relationships of the various properties of a technology to those dynamics. The perspective presented in what follows attempts to provide a coherent framework linking together (1) the various properties of technology-as-organization, (2) the economic and social consequences of introducing a new or improved technology, (3) the political and governmental responses to such economic and social changes, and, finally (4) the probable effects which governmental responses might have for further technical development and/or control.

By striving to elucidate such a perspective, drawn out in some detail through research in specific technological areas, policy makers and citizens can escape from the vague, generally inchoate syndrome of "what if" speculation which seems to infect much technology-society

analysis. At present we have little upon which to base decisions about the impact of technological development on social life. We have impressionistic, intuitive feelings about "what will happen *if*...": if a large nuclear power plant is actually built along the seacoast; if a freeway really cuts through a ghetto; if biological engineering techniques determining the sex of unborn children really are employed; or if frequent reliable airtransport really becomes available to most remote rural communities.

The simplified schema in Figure 1-2 serves as an assumed set of fundamental relationships between different aspects of technology-society interaction. This perspective informed our approach to the study of the Ohio County Airport Program reported in Parts II and III below, and depends on the following definitions and assumptions about the dynamics of social and political change.

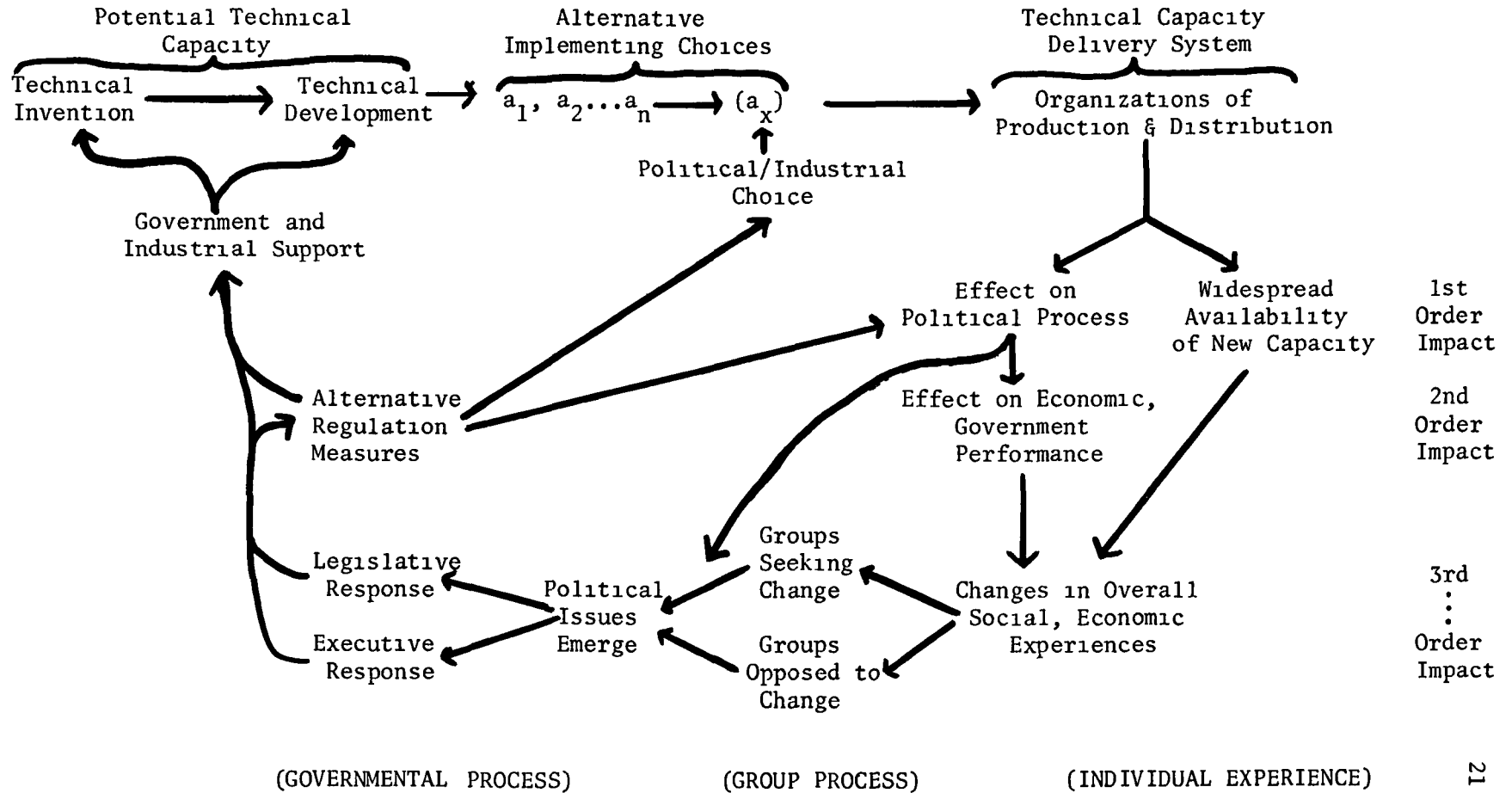
1. That social change is fundamentally a change in the distribution of economic and social privilege within a community or society. It is signalled by the relative increase or decrease in the capacity people have to accrue economic or social status and the amenities associated with that status.

2. That political change is a consequence of changes in and/or aspirations for a change in the distribution of economic or social privilege in a community or society. Political issues emerge and are brought into the public sphere when groups of people experience sufficiently similar experiences and/or aspirations so that they see it in their interest to organize and press claims on political institutions for change or for the maintenance of the status quo.

3. That technology, as understood here, combines new capacities to alter the world, change personal experience, and organize productive activity. With expected or actual widespread distribution of this capacity the particular distribution of privilege within a community or society may be reinforced or altered.

FIGURE 1-2

SIMPLIFIED PATTERN OF TECHNOLOGY-SOCIETY INTERACTION



As a new capacity becomes available it often changes the relative advantage in the competition for economic and social status. Such change may either reinforce or threaten existing patterns of privilege within a population.

We claim that technology, so conceived, is genuinely an "independent variable." That is, along with the establishment of complex organizations of various sorts, technology is one of the few realms of activity often intentionally initiated and developed by human beings to alter their own experience and the experience of others around them. Pursued systematically through economic and governmental organizations, technological development and the social effects associated with it does alter the world in important ways. In this sense, technology is actually an "antecedent variable." Pursued by human beings in the search for particular outcomes, technical development is one of the several ways social man has of changing his experience. In this way, it differs from "analytical independent variables," such as social class or income distribution, over which policy makers have little or no control. This is not the case for technological development.

Technical Systems As Initial Stimuli

The sequence of relationships schematically depicted in Figure 1-2 presents the flow of interactions we believe characterizes important aspects of the relationship of technology and society. Across the top of the figure is the sequence of relationships associated with the Potential Technical Capacity we discussed in this first part of this chapter. It includes the concepts, technical inventions, prototypes or models, the analytical process, and the development phase in which the feasibility of the new technical potential is determined. A great deal of attention has been devoted to this phase in the Research and Development literature concerning the management of innovation and research administration.¹⁴ During the past two decades the Federal government has been the chief contributor to the remarkable growth of the country's technological inventive capacity.¹⁵

There has been somewhat less attention paid to the processes of decision making involved in choosing to implement one technological alternative or another.¹⁶ But it is clear that when a new technical potential is recognized and partially developed, there are normally several ways of making that potential available to citizens and consumers. Choices are made, for example, to develop automated rapid transit systems rather than manually controlled trains, it is determined that kidney machines will be geared to large centralized facilities rather than designed for home care, and decisions are made to build airports capable of accepting huge jumbo jets rather than futuristic supersonic transports.¹⁷ In effect, political and social choices are made by both industry and the government to pursue one technical alternative or another within the same general technical area. Significantly different alternatives in both the design and the implementation of a technical possibility often exist--each with potentially different social and political outcomes.

Making such decisions implicitly assumes both the knowledge of the likely economic and social experience prompted by each technical alternative and the political knowledge of who will benefit and who will be disadvantaged (and to what consequence) by these same alternatives. In this sense technical development is not a straightforward "technical" matter. Rather these decisions have far reaching social and political consequences for those who produce machines and structures and for those who are benefitted or harassed by their use. Below we present illustrations of how the perspective in Figure 1-2 would inform an analysis of airtransport utilizing STOL aircraft.

Airtransport as Stimulus: "Prospects" of a STOL-based Transport System

Providing transportation by using STOL-aircraft requires that both the technical problems of slow flight and noise suppression are solved and that a sufficient number of landing sites are available--either through modifying existing airports or by constructing suitable new ones. New

aerodynamic concepts, such as sophisticated externally blown flap control features, for example, must be implemented to enable larger loads to be carried in jet aircraft at significantly slower speeds than are presently necessary. Airport construction and/or modification is a crucial phase of developing various strategies for implementing STOL-based transportation. The way this is carried out determines much of the social and political impact of such a system. Thus a combination of aeronautical technology and less exotic construction design make up the dynamic and static parts of air transport system potential.

For the purposes of the field study reported in Parts II and III we assume that the technical puzzles of slow flight and noise suppression could be solved in the near future. Furthermore, we assume that airport design and construction could be accomplished with relatively little technical innovation. Our major questions then were related to the consequence of choosing one way rather than another to implement this potentially feasible, high performance, short landing pattern transportation capability. Three different strategies could be followed, each conceived in terms of its relationship to existing modes of transportation.

(1) *The Mutually Exclusive System:* in which STOL-based transport is delivered to areas not served either by regular airlines or by well developed rail or highway networks. This system would be almost certainly limited to rural and/or underdeveloped lands away from population centers. Special technical requirements include aircraft capabilities for carrying both passengers and freight, for landing and taking off on surfaces which may be relatively rough, and very likely the design and construction of small airports capable of accepting STOL aircraft. The latter requirement in turn would probably prompt considerable physical change of the area chosen as a landing site for STOL aircraft.

(2) *The Competitive System:* in which STOL-based transport is designed specifically to compete with existing modes of air and ground transport, generally along well-traveled routes now in use. Technical requirements include the development of aircraft which can be operated

at costs competitive with other modes of passenger transport. The matter of landing sites is somewhat simplified, for very likely the population centers interested in STOL service would already have suitable airports. Operating authorization and traffic control procedures so that STOL aircraft could safely mix with large jet aircraft would be necessary. Should the Competitive Strategy include service delivered directly to potential customers in the central city, then all of the design and construction problems associated with the Mutual Exclusive Strategy would be present, in addition to the greatly increased political problems of finding a suitable site "close in."

(3) *The Integrated Transport System:* in which STOL operations would be integrated quite carefully with existing and future rail and highway networks and with other airline scheduling. This strategy would require a much more fully integrated planning perspective and more comprehensive policy efforts than have ever been the case for transportation planning. Technical requirements could include all those associated with the other two alternatives. To these must be added major technical achievements in management practice and in coordinating techniques and supporting innovations in computer technology.

Any one or a combination of these alternatives could be the strategy employed at national or regional levels. In fact, the competitive and mutually exclusive plays both have been studied regionally.¹⁸ It is intuitively clear that significant differences in the probable outcomes for social development will depend on which particular strategy is adopted. It is probable, for example, that if the mutually exclusive strategy is carried out, the technical development of the machines themselves, air traffic control measures, routing decisions, the design and operation of airports, and community effects will be rather different from what they would be if strong competition between air carriers were encouraged. Whichever strategy is employed, either by government support or industrial initiative, it will have important consequences for manufacturers, airline companies, construction firms and certainly for airport management. It is the coordinate activity of these groups which would deliver a widespread, increased technical capacity to citizens and

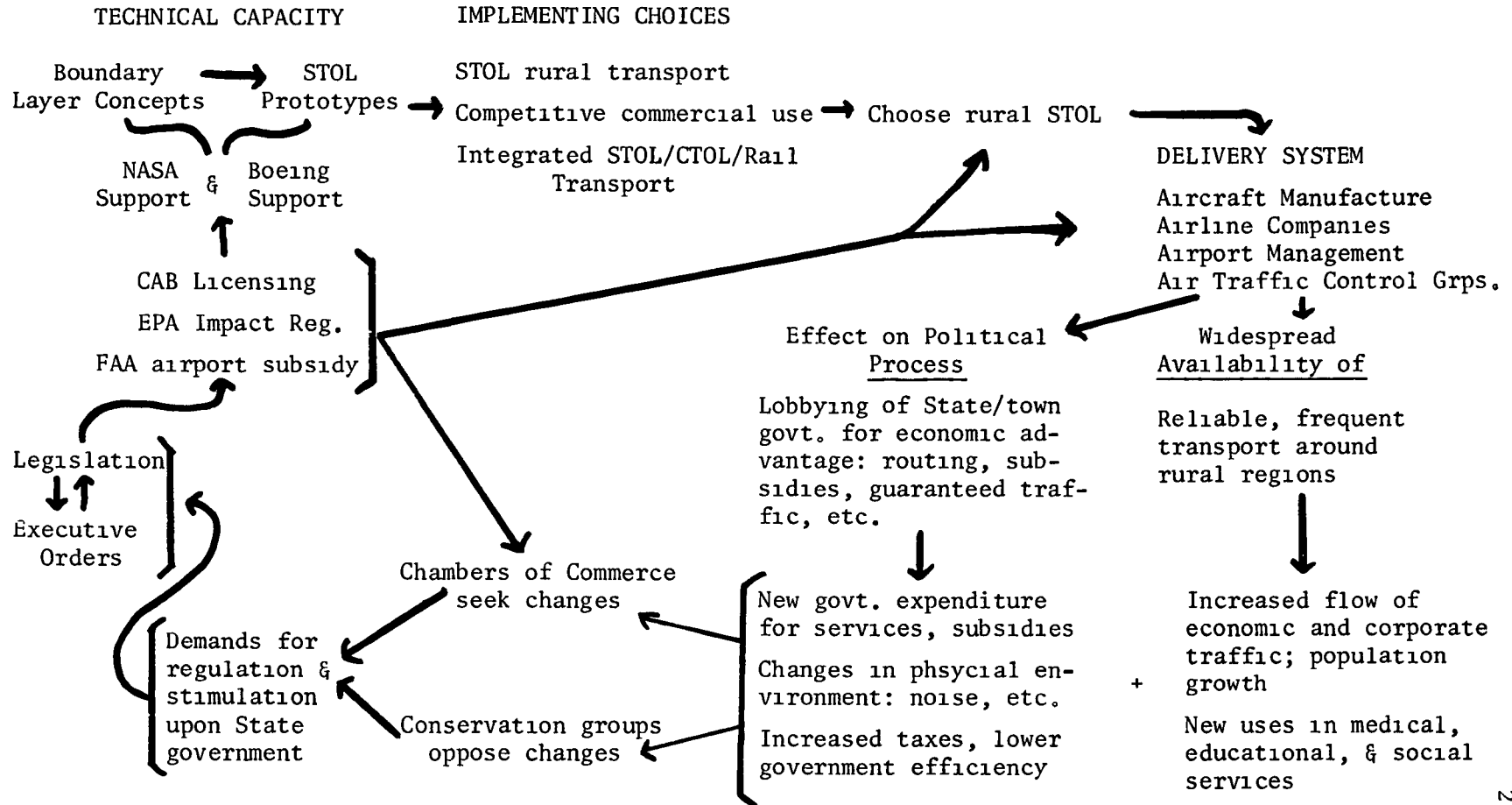
consumers. When such technical capacity is distributed widely, either as a consequence of governmental policy or the uncoordinated growth of industrial interests, the combined organizations of manufacture and use become an important source of impact as well as does increased use of the new technical capacity for frequent and reliable travel. In the section below we explore how these organizations and new capacities may be quite directly linked to altered social conditions.

Avenues of Social Consequence

As a technological capacity is utilized, two sources of social impact develop simultaneously.¹⁹ The first follows from the widespread availability of new opportunities for consumers. The second issues from the particular behavior of the organizations whose economic and political power is based on the production and distribution of this new opportunity or capacity.

The first avenue of consequence is schematically represented on the extreme right of our general perspective depicted in Figure 1-2, and in Figure 1-3, a rendering of this perspective in terms of the STOL-based air transport technology. Every technology has both intended and unintended capacities. In the case of STOL-based transport system the *intended capacity* is to improve physical mobility around a region. This means increased mobility of people and materiel. In Figure 1-3, we attempt, in quite oversimplified fashion, to trace out some of the connections related to implementing a Mutually Exclusive Transport strategy, i.e., delivering airtransport capability to rural areas. The full range of uses to which a new capacity such as this would be put is not clear; we know that people are quite capable of inventing uses never envisioned by those who design a particular technology. In the STOL example, a new option to move people and freight about a region more frequently, more reliably and more flexibly could very likely increase the flow of commercial goods. And because executives would be enabled to travel around more in remote regions, it could contribute to the growth of local factories and, perhaps indirectly, prompt population increases

FIGURE 1-3



associated with industrial development. Other uses as well can be imagined: new educational opportunities, medical services, and recreation options pursued as a result of reliable transport according access to wilderness areas.

But there are unintended capacities delivered also. STOL aircraft and STOLports have the capacity to pollute the air, disrupt the ecological balance of the airport environs, and increase noise levels significantly. Further such a technology has the capacity to transport people and materiel in such quantities that a small community could be inundated with strangers to the degree that the community's own social balance is threatened. Thus, better information and understanding about the effects of both the intended capability and unintended spinoff capabilities (both positive and negative) is required for a sensible analysis of a technology and its consequences. An important aspect of the field study reported in Part III was an attempt to gain a better understanding of the actual uses of airtransport in relation to those intended by the leaders of the Ohio County Airport Program.

The second source of consequence, flowing from the impact of the organizations that produce and distribute new technical capacities, has not drawn much attention in studies of technology and social change. There is almost no attention to such things in most feasibility studies conducted by agencies interested in one new technology or another. This was certainly the case for STOL feasibility studies.²⁰ Through their activities within the processes of political decision making at national, state and local levels, these organizations seek economic and operational advantages which make their work both more profitable and easier to carry on. At the national level, we see the aircraft industry lobby for advantages in public subsidies and tax allowances. We see, as well, airline interests pressure both national and local bodies for special prerogatives in airport locations, landing fees, and for special routing benefits. Also evident is the intervention of employee organizations attempting to upgrade their own working conditions and salaries. The recent unsettling strikes and work slow downs by airline personnel and

air traffic controllers exemplifies the kind of pressure on both local government and national agencies which can accompany the improvement of airtransport capabilities. And there is yet another source of impact--the incentives and constraints generated by state and Federal agencies intent on pursuing their own missions. We have seen them emerge dramatically in the uses of political and technological power wielded by the various highway agencies and lobbies.²¹ To a lesser extent agencies such as the FAA and the various state departments of aviation employ such tactics.²² In Part II we shall see something of the extent to which the Ohio Division of Aviation was responsible for the widespread increase in air transport capacities throughout the state.

Such indirect influences alter the effectiveness of local institutions and occasionally the character of local communities. Sometimes such influence actually seems to improve communities' capabilities to cope with their own problems. But perhaps more often new technological developments and the attendant demands from producing and distributing organizations present communities with problems they are ill-equipped to solve. There is a strong likelihood that new technological capabilities reduce the efficiency of local government, at least in the short run, and, as a consequence, alter the experiences of local citizens and consumers. Again, very little systematic information is available about the particular ways in which technological development influences the effectiveness of local government and shapes economic affairs.²³ In Parts II and III, we attempt a first approximation of such matters in both concept and field methodology.

Public and Governmental Responses

It is obvious, if not well understood, that a technology's longer-term consequences for the experiences of people grow out of changes in the patterns of social activities altered by the new capacities of technological organizations and new consumer/citizen alternatives. New alternatives often enhance the possibility of developing new values. The options, when tried, reveal the worth of the activity.²⁴ New alternatives

sometimes give advantages to groups in the struggle to reach their objectives. Some technical changes are seen as a dramatic threat to the pleasing aspects of community life. Other changes may be seized upon by community leaders as necessary developments in the pursuit of economic development for the community-at-large. Thus, the new technologies and the activities of organizations associated with them are perceived in terms of the particular understanding people have about how their own lives will be affected--either for good or ill. If there are sufficiently similar kinds of perceptions and the spark of local leadership, groups may organize to defend existing situations or to advocate change. Local business leaders and chambers of commerce in rural communities, for example, may support a local airport in the belief that it is necessary for their town's economic health. Other groups may not feel so enthusiastic about the likely noise, and/or potential public subsidy often associated with air transport facilities.

Depending upon the strength of the reactions, it is likely that public bodies at local, state, and national levels will be pressured to give political sanction to the development and/or regulation of the new transport technology or will be pressured to remain uninvolved with its private development. This part of the sequences traced out in Figures 1-2 and 1-3 is more or less familiar and the object of much comment in the literature.²⁵ These are the processes of group politics in support of citizen or vested interests. Claims are pressed upon various political bodies in the often rough and tumble process of American politics. "Freeway revolts" have become familiar, and we are witness to often acrimonious public hearings associated with the extension of airport runways, etc. Once again, we have little sense of the public's feelings toward technological innovation which draw the fire of public debate and stimulate political issues.²⁶

As technology-specific issues are aroused, they filter variously into the processes of political debate and decision making at different levels of American government. If there is sufficient public demand and/or leadership concern, political action through legislation or executive order may be taken to adjust the governmental regulation of a new or improved transport technology. We can imagine, for example, that STOL

transport delivered to rural areas could arouse the Environmental Protection Agency or the Federal Aviation Administration to special considerations which would give one group or another the edge either in exploiting such a development or in blocking it altogether. The FAA or State governments might provide matching grants to small communities so that they could equip their local airports with instrument landing capabilities or furnish terminal facilities. It is also possible to imagine that strong conservation interests, fearing the spoilage of nearby wilderness or other ecologically precious areas, would use the EPA procedure to make it impossible for a community to receive STOL facilities. And it is even possible to imagine that such a technical improvement would be received with very little or only modest notice. In these cases effects following from such a technological change may be quite negligible or may become consequential only after a considerable length of time.

Most attempts to control technology through regulation come *after* the technology has been designed, developed and is in the process of being widely dispersed. Often, such intervention is a response to public concern about both a technology's direct effects and the indirect ones triggered by groups and organizations having a vested interest in introducing it. In effect, the "intrusion of technology" stimulates *post-hoc* regulation.

Because crucial aspects of the technology-society interaction process are overlooked, the potentials of alternative modes of regulation are seldom considered. Sometimes, however, increasing regulation of the *post-hoc* effects of technologies results in attempts to anticipate problems and "design them out" *before* a new technical system becomes widely used. The controversy over noise pollution and the SST is an example. Such anticipation adds another dimension to our understanding of technology-society interaction. There is no reason to suppose that new regulatory criteria could not be injected into the existing design processes for transportation vehicles, for the configuration of airports and for road systems. Measures could be taken with an eye to reducing the negative consequences of introducing STOL-based transport into rural areas before

the airports are in place. Or measures could be taken to improve the chances that local communities could be marshalled in support of this potential opportunity to increase civic consciousness. Many such effects could be sought. But it is not possible, given the state of our knowledge, to do so now on a systematic basis. While we can report instances of these aspects of the implementation of a technology, we do not have the basis for reliably judging the consequences of one system's design against another's in terms of their probable social or political effects. Nor do we have much more than stories and intuition about the properties of the organizations that produce and distribute technical capacity which are likely to alter the effects of introducing a new or improved technical capacity.

Toward Application of This Perspective

This chapter has set out the perspective that informed our effort investigating the impact of airtransport capability upon smaller communities. Our mission was to explore the feasibility of its use as a basis for improving the quality of technology assessment efforts. In so doing we have asserted a number of plausible relationships which necessarily must remain unrefined until more empirical research is conducted. It would be a mistake to come away from our presentation with the implicit conclusion that we expected any technological development to have visible, perhaps dramatic, consequences at the level suggested in Figures 1-1 and 1-2. While this might happen for some types of quite large scale developments--for example, the massive developments around the Gulf Crescent in the building up of the machines and structures of the manned space program--it is likely that more subtle effects can be seen, if searched for, in smaller technological developments more embedded in day-to-day experiences. If the case is persuasive that technology can sensibly be viewed as social experience then change should have occurred in less dramatic technical developments as well as those pressed forward into the public view. In the refinements of technology assessment, the nuances of technology's social effects are fully as important as the more obvious effects of patently massive public works.

Then what expectations do we hold for our approach? First, that a sensitivity to both technology's dramatic effects and the more subtle experiences it produces be carried into the field, and second, that a little deeper understanding of the experience of technology be forthcoming. We believe that the more general perspective employed here proved to be an aid to a better appreciation of the complex nature of technology's effect on social experience. We have a better sense of the magnitude of the effort likely to be required to improve the knowledge base necessary for credible technology assessment. These efforts are likely to be considerable, if our experience is a reliable guide. To satisfy the canons of social science research, care must be taken to assemble data representing a good deal of the variation and complexity of actual social experience. Needless to say, our resources were limited and the problem somewhat vaguely defined at first. Thus the empirical work reported below in Parts II and III focuses almost exclusively on those relationships traced out along the right-hand side of Figures 1-2 and 1-3. We chose to struggle with the relationships about which the least is known. The processes of group politics, community relations, and the difficulties of regulation have been the object of research for many years and the processes of technical invention and technological diffusion have received considerable emphasis over the past decade. In an effort to explore the relationships between these two more trafficked areas, a field study of the Ohio County Airport Program was undertaken.

NOTES

¹Notable exceptions to the unfettered uses of technology can be seen in the era of conservation at the turn of the century, particularly under Theodore Roosevelt and with the development of the conservation movement and the birth of the U.S. Park Service. It is only recently that this movement for the conservation of natural resources has re-emerged with great political importance. See Harold Howland, *Theodore Roosevelt and His Times, A Chronicle of the Progressive Movement*, (New Haven: Yale University Press, 1921), Ch. 9.

²See G. R. Taylor, *The Transportation Revolution, 1815-1860*, (New York: Rinehart, 1951); B. Chinitz, *Freight and the Metropolis: The Impact of America's Transport Revolutions on the New York Region*, (Cambridge: Harvard University Press, 1960) and especially M. Kranzberg, "The Social Impact of Transportation Technology: Some Lessons of History," paper for *Symposium on The Issues and Challenges of Air Transportation*, (May, 1963). See also R. A. Rice, "Historical Perspective in Transport System Development" Carnegie-Mellon University, Transport Research Institute, (May, 1970). Also see the map depicting the relative size of the United States in terms of transportation technology and capacities in Marion Clawson, *America's Land and Its Uses*, (Johns Hopkins University Press, 1972).

³We do not mean to suggest that this trend is necessarily inevitable. Although the designers of machines and organizations for technological implementation have arranged it in such a way that an increase in scale seems to follow "logically" and without debate, we can find no *inherent* reason for this to be the case. For the present we choose to entertain the hypothesis that technical "progress" can be achieved without a commensurate increase in the scale of overall operations. See J. Serge Taylor, "Organized Complexity in the New Industrial State: The Role of Technology," in *Organized Social Complexity: Challenge to Politics and Policy*, Ed. Todd R. LaPorte (Princeton: Princeton University Press, 1975), Ch. III. Cf. J. K. Galbraith, *The New Industrial State* (New York: Houghton Mifflin, 1967).

⁴Discussion of these problems is most current in environmental literature and that associated with technology assessment. See National Academy of Science, *Technology: Process of Assessment and Choice*, Report to House Committee on Science and Astronautics, (July, 1969).

⁵For an analysis of this situation, see Matthew Edel, *Economies and the Environment*, (Englewood Cliffs: Prentice-Hall, 1973), Ch. 6.

⁶See LaPorte et al., *Social Change, Public Response, and Regulation of Large Scale Technology--Questions in the Social Assessment of STOL Aircraft Transport*, Institute of Governmental Studies Progress Report to NASA-Ames, 1972, pp. 17-37 and J. Forester and T. LaPorte, "Technology

Assessment and Policy Analysis: A Critical Discussion," Working Paper no. 13, Institute of Governmental Studies, University of California, Berkeley (forthcoming).

⁷ Various presented in G. C. Kenyon, T. L. Galloway and H. M. Drake, *An Economic Analysis of Future Short-Haul Transportation*, Advanced Concepts and Mission Division, Office of Advanced Research and Technology, NASA (NASA TM X-2228), March 1971 and in Martin V. Jones, *A Technology Assessment Methodology: Some Basic Propositions*, MITRE Corp. (MTR 6009), vol. 1 for the Office of Science and Technology, June 1971. See also the discussion in I.G.S., *Progress Report to NASA-Ames*, 1972, Ch. 2.

⁸ Jones, *op. cit.*

⁹ For examples of other attempts to add precision to the term "technology" see many of the articles in C. Mitcham and R. Mackey, eds., *Philosophy and Technology* (New York: Free Press, 1972); and Leo Marx, "Technology and the Study of Man," Ed. W. R. Niblett, in *The Sciences, the Humanities and the Technological Threat* (London: London University Press, 1974).

¹⁰ For an approach to the problems of technology rooted essentially in this meaning of the term, see C. Susskind, *Understanding Technology* (Baltimore: Johns Hopkins Press, 1973).

¹¹ See D. P. Billington, "Structures and Machines: The Two Faces of Technology," *Soundings* (Fall, 1974), pp. 275-288, for an interesting discussion of the quite different implications these two types of physical objects have for political and social criticism.

¹² The Boeing Company for Ames Research Center, NASA, *Study of Aircraft in Short-Haul Transportation Systems* (NASA CR-986, Jan. 1968). See also Douglas Aircraft Company for Systems Study Division, NASA, *Parametric Study of STOL Short-Haul Transport Engine Cycle and Operational Techniques to Minimize Community Noise Impact* (NASA CR 114759, June, 1974). Cf. J. J. Foody, "Technological Forecasting and Risk Assessment in V/STOL Transport Area," *Technological Forecasting and Social Change*, 3 (1971), pp. 89-98. For a summary of earlier studies, see Langley Research Center for NASA, *A Preliminary Study of V/STOL Transport Aircraft and Bibliography of NASA Research in the VTOL/STOL Field* (NASA TN-624, Jan., 1968).

¹³ See below note 20 and, for example, R. H. Miller, "Some Air Transport Concepts for the Future," *The Aeronautical Journal* 75 (July, 1971), pp. 431-456.

¹⁴ For a good summary of the innovation literature, see G. Zaltman, R. Duncan and J. Holbek, *Innovations and Organizations* (New York: Wiley, 1973). See also R. Jones, "Research Administration: Its Relative Size in the Organization" and F. Buchtel, "The Integrative Aspect of Policy Develop-

ment for Research Administration, *Journal of the Society of Research Administrations* V. 4 (Spring, 1974), p. 17; p. 41. Research management concerns are summarized in W. Kornhauser, *Scientists and Industry: Conflict and Accommodation* (Berkeley: University of California Press, 1962) and F. Kast and J. Rosenzweig, eds., *Science, Technology, and Management* (New York: McGraw-Hill, 1963).

¹⁵ See summaries of this trend in M. D. Reagan, *Science and the Federal Patron* (New York: Oxford University Press, 1969). See also National Science Foundation, *An Analysis of Federal Research and Development Funding by Function--Fiscal Years 1969-1974* (NSF 73-316) and *Fiscal Years 1963-1973* (NSF 72-313); *National Patterns of Research and Development Resources: Funds and Manpower in the United States, 1953-74* (NSF 74-304) and *Federal Funds for Research, Development and Other Scientific Activities*, Vol. XX, 1970, 1971, 1972 (NSF 71-35), Vol. XXI, 1971, 1972, 1973 (NSF 72-317), Vol. XXII 1972, 1973, 1974 (NSF 74-300).

¹⁶ Some examples are H. M. Sapolsky, *The Polaris System Development: Bureaucratic and Programmatic Success in Government* (Cambridge: Harvard University Press, 1972, and Garry Brewer, *Politicians, Bureaucrats and the Consultant: A Critique of Urban Problem Solving* (New York: Basic Books, 1973).

¹⁷ S. Zwerling, *Mass Transit and the Politics of Technology: A Study of BART and the San Francisco Bay Area* (New York: Praeger, 1974); Richard Rettig, et al., Ohio State University, School of Public Administration, "Kidney Therapy and Public Policy: A Study of Medical Innovation," (research project proposal to National Science Foundation, 1973); D. Nelkins, *Jetport: The Boston Airport Controversy* (New Brunswick, N.J., Transaction Books, 1974); and J. D. Starling, *Prometheus Unbound: A Study of the Dallas/Fort Worth Regional Airport*, Center for Urban and Environmental Studies, Southern Methodist University (Oct., 1974).

¹⁸ See R. S. Shevell, assisted by D. V. Jones, Jr., *Studies in Short Haul Air Transportation in the California Corridor: Effects of Design Runway Length, Community Acceptance, Impact of Return Investment and Fuel Cost Increase*, Stanford University, Transportation Research Program, Department of Aeronautics and Astronautics (SUDAAR no. 460), submitted to NASA July, 1973. See also Multidisciplinary Associates, *STOLport Site Selection and Evaluation Study for San Francisco and Oakland* (report to NORCALSTOL, Greater San Francisco Chamber of Commerce, July, 1971). Cf. R. A. Ausrotas, "STOLports for the Northeast Corridor," (Technical Memorandum 71-6), MIT Flight Technology Laboratory, Department of Aeronautics and Astronautics, July, 1971; the Boeing Company for NASA, *Study of Aircraft in Interurban Transportation Systems: San Francisco Bay Area* (NASA-CR--), September, 1971; H. W. Webb, Aerospace Corporation for Advanced Concepts and Missions Division, NASA (ATR-73), July, 1972; Lockheed-California Company for Ames Research Center, NASA,

Study of Aircraft Intra-Urban Transportation Systems, June, 1972; and S. L. Katten, the RAND Corporation, *Systems Analysis of V/STOL Operation on Short-to-Medium Haul Routes* (D-18698), April, 1969.

¹⁹While this is the case for a great many technological developments, there is another class of technological capacity which does not directly benefit consumers or citizens, yet is of considerable influence upon our lives. These are the technologies of destruction which, when available to national leaders, provide the basis for great political power. Again it is the possibility of widespread use of such weapons that occasions the social and political impact. In these cases it is the *withholding* of use that is the benefit.

²⁰R. K. Waldo and P. D. Tilton, Stanford Research Institute for Federal Aviation Administration, *An Economic Analysis of Commercial VTOL and STOL Transport Aircraft* (FAA-ADS-25), February, 1965; Stanford University Department of Aeronautics and Astronautics for NASA, *A Design Study of a Metropolitan Air Transport System (MAT)* (SUDAAR no. 387), August, 1969; G. C. Kemper, T. L. Galloway and H. D. Drake for Advanced Concepts and Missions Division, Office of Advanced Research and Technology, NASA, *An Economic Analysis of Future Short-Haul Transportation* (NASA CR 114612), June 1973; and H. L. Solomon and S. Sokolsky, Aerospace Corporation for Ames Research Center, NASA, *An Economic Assessment of STOL Aircraft Potential Including Terminal Area Environment Considerations* (ATR-73 [7305]-1), July, 1973. Cf. J. H. De Leeuw and L. D. Reid, University of Toronto Institute for Aerospace Studies for Canadian Transport Commission, *An Assessment of STOL Technology* (UTIAS no. 162), November, 1970.

²¹Curiously, even though there have been periodic "freeway revolts" and other local opposition to highway construction, these political reactions have stimulated very few systematic studies. For the tone of these reactions, see C. Lydon, "Battle over Highway Policy Intensifies," *New York Times*, April 4, 1972 (XII, 24:3); D. Rosenbaum, "For the Highway Lobbies, A Rocky Road Ahead," *New York Times*, April 2, 1972 (XI, 13:1), and "Highway Lobby Triumph," *New York Times* editorial, July 29, 1972 (IV, 12:2); See also *The California Journal*, Sacramento, "Gasoline Tax," Vol. 1:1 (Jan., 1970), p. 10, "Transit Fund Bills Move Step Closer to November Vote," Vol. 1:7 (July, 1970), p. 190, "Smog, Transit Proposition Rejected," Vol. 1:11 (Nov. 1970), p. 308, and "Proposition 18 Spending Controversy Continues," Vol. 1:12 (Dec. 1970), p. 346.

²²See especially J. D. Warford, *Public Policy Toward General Aviation* (Washington: Brookings Institution, 1971), Ch. 2.

²³One of the few exceptions may be found in L. B. Young, *Power Over People* (New York: Oxford University Press, 1973).

²⁴J. G. March, "The Technology of Foolishness," in *The American College President* (New York: McGraw-Hill, 1973).

²⁵In, for example, A. F. Bentley, *The Process of Government*, Ed. Peter H. Odegard (Cambridge: Belknap Press of Harvard University Press, 1967); R. A. Dahl, *Polyarchy: Participation and Opposition* (New Haven: Yale University Press, 1971) and *A Preface to Democratic Theory* (Chicago: University of Chicago Press, 1956); G. McConnell, *Private Power and American Democracy* (New York: Knopf, 1966); E. E. Schattschneider, *The Semi-Sovereign People; A Realist's View of Democracy in America* (New York: Holt, Reinhart and Winston, 1960); and D. B. Truman, *The Governmental Process; Political Interests and Public Opinion* (New York: Knopf, 1964).

²⁶The NASA-sponsored research project encompassing this present report launched an important inroad against this deficiency, in the form of a survey of public attitudes toward technology undertaken in 1972 and updated in 1974. Preliminary findings were reported in Chapter III of our 1972 Progress Report. Final analysis of survey results is underway at present and will be submitted in another monograph length report in summer, 1975. Thus far, findings have also been reported in T. LaPorte and D. Metlay, "They Watch and Wonder--The Public's Attitudes Toward Technology: A Survey," I.G.S. Working Paper no. 6 (Feb., 1973), "Technology Observed: Attitudes of a Wary Public," *Science*, Feb., 1975 and "Public Attitudes Toward Present and Future Technologies: Satisfactions and Apprehensions," *Social Studies of Science*, forthcoming.

CHAPTER TWO

AIR TRANSPORT CAPACITY AS A SOURCE OF CHANGE

In Chapter One an expanded view of technology-as-a-social-system is presented and developed into a general schematic outline of the likely associations among aspects of technology, institutions familiar to us in everyday life and various citizen experiences. Chapter One also attempts to illustrate that scheme by drawing parallels for a specific technological area--STOL-based air transportation. Almost all of Chapter One was necessarily based on a transfer of sociological and political science concepts to a topic in which they enjoy only scant use--technology's impact on social and political experience. While such an exercise may take us a little way down the road to increased insight, without a firm basis in empirical work our perspective is not likely to lend itself to the kind of policy analysis necessary for improved technology assessment.

It is the business of this chapter to approach greater specificity by defining the context of a study exploring the consequences of improved airtransport capacity delivered through the Ohio County Airport Program to smaller communities in Ohio. Important aspects of this context include (1) the body of folklore which has encouraged an enthusiasm for airport development as a stimulus to local economic growth and, to some extent, has seemed to shape the expectations for the Program's objectives; (2) the initial conceptualization about the relationships between airports and communities that the research team carried into the field and our expectations for likely effects of airport development upon communities; (3) the process of orientation and selection used preparatory to actual community studies; (4) some of the methodological hazards which had to be kept in mind; and finally, (5) a bit about the broader national context of the Ohio County Airport Program itself.

Folklore of Airports and Community Development

In 1970, Congress passed the Airport and Airway Development Act. This bill authorized the expenditure of over \$15 billion in Federal and local matching grants during the ensuing decade to expand the capacities of air transportation in the United States. Much of this money has gone into very large capital projects such as the New Dallas-Fort Worth International Airport. But a good deal of it continues to be spent by smaller communities as they dig into the local public purse for dollars to match the grants offered by the Federal Aviation Administration or various State departments of aviation or aeronautics. This legislation further institutionalized a trend in the promotion of local airports which has been growing for the past two decades. What seems to be the promise of such airport programs for local communities? What are the perceptions and beliefs surrounding these ventures in offering local communities the potential glamour of "High Technology"?

"The Airport Increases Civic Wealth"

The central theme of these beliefs is expressed in that caption appearing in "The Airports Manual, An Examination into the Role of Airports in the Communities They Serve," a pamphlet prepared in 1955 by the Air Transport Association of America. This rationale, virtually unmodified for the past two decades, has been the central incentive for the promotion of airport development. Clustering under this central assertion is a nest of reinforcing notions about the effects of airport development on towns and cities. Elements of these beliefs have been buttressed by stories and by a logic that builds on two central points: first, that there has been and will continue to be a substantial growth in the number and use of aircraft not committed to scheduled airline operations, and second, that future industrial growth will be characterized by widespread geographical decentralization. In a moment we will discuss a number of the points that flow from these premises, but first, what seems to prompt the continued vigor of these assertions?

These beliefs are encouraged by the combined efforts of trade associations and pilot groups and the various national and state agencies whose legislated mission is to improve and monitor the air transport

capability of this country. For some time such groups as the Air Transport Association, the General Aviation Manufacturers Association, (GAMA), the Aerospace Industries Association of America, and various pilot associations have published in trade journals materials exhorting communities to look kindly, even eagerly, upon the opportunity to construct or improve local airports. In tandem with these efforts, the Federal Aviation Administration and various State departments of aviation or aeronautics have conducted studies and issued reports which attempt to alert local communities to the benefits of and means to accomplish these improvements. While these parallel efforts are somewhat different in tone as they pursue their commercial or agency interests, the net effect has been to encourage communities to take up the added responsibilities of a local, municipal or county controlled airport. Often the airport is viewed as a "public utility" such as highways or sanitation plants. Increasing amounts of Federal and state funds have been available for this purpose, and almost all of the material issuing from these two sources attempts to persuade local leaders that it is worth the resources of their communities to add the necessary matching monies or wholly fund the enterprise. These beliefs about airports, then, seem to promise much in return for only modest local investment.

One publication after another "shows" how airports are good for communities, how, with an airport, substantial industrial and economic benefits accrue. The sense of this promotional material, especially emanating from the trade associations, is that those communities who do not have a local airport will be missing out on the fruits of future economic growth.

The logic threading through these beliefs builds on the two premises noted above, i.e., that the number of aircraft used by business is growing and that industrial expansion will take the form of substantial decentralization. While there is little or no attention paid to the reasons either of these conditions might be likely, the central assertion is that with dispersed industrial branches executives will need to travel farther in order to maintain corporate coordination and sales contacts. The time such travel will take can be translated into costs per hour and per mile. In a dispersed situation travel could take up substantial

amounts of time and, therefore, money. Thus in order to minimize transportation costs (claimed to be about 25 per cent of current operating costs) firms seek a combination of transportation that will be the most rapid and time-saving. Because airplanes are the most rapid, industry will continue to increase their use of this mode. But airplanes need places to land and receive service. Therefore airports with reasonably complete navigation and aircraft service facilities are required.

Based on this "logical case," and accompanied by many statistics and examples, communities are then exhorted to get ready for the projected boom in industrial dispersion. Under a headline asserting

"How To Land 60,000 New Jobs"

the General Aviation Manufacturers Association exhorted:

You have a choice. You can watch your town stagnate economically. Or you can help stir up new business. Often the differences come down to one thing. A Community Airport. New Airports attract new industries, keep present ones thriving.¹

The ad goes on to cite the example of many towns in Ohio where, it is asserted, "60,000 new jobs and \$250 million in personal income are attributed to the state's new network of community airports."² A publication of the General Aviation Manufacturers Association summarizes the apparent benefits to the community of a new or improved airport. They assert that "New Industry and New Jobs, New Money and Broader Tax Base" follow from such a development.³

In one of its own pamphlets, the GAMA argues that

The airplane is an established tool of modern business. Industry locates and expands where it can best use this tool. One of the first questions asked by executives seeking a site for a new plant or business is "What kind of air transportation is available?"⁴

This message ends with this explicit warning: "A survey of 500 top U.S. firms indicated that 80 per cent would *not* locate a new plant where there is no airport available..."⁵ Presumably, then, a community intent upon keeping abreast of the times economically should dash out and begin taking advantage of this opportunity. These same arguments and opportunities are pressed, in somewhat muted form, by state agencies of aviation as well.

Published in special reports and through magazines focusing on municipal matters, such as *The Minnesota Municipalities* and *Texas Town and City*, city managers and other leaders are offered a means of improving the economic health of their communities. After a brief statistical summary of the growth trends in general aviation in Minnesota, an article entitled, "A Municipal Airport Aids Business Development," cites several stories of economic development apparently associated with local airports. The article insists because so many different activities are now using flight as a tool, each community probably needs an airport. Finally, city leaders are invited to seek out the Minnesota Department of Aeronautics for the funds to be used in airport construction and improvement. "You can get an airport for the cost of the land," the article promises.⁶ About the same time, the communities of Texas were treated to a message about "Your Airport and How to Get It!" It asserted:

One answer to the economic growth of smaller cities lies in a well planned airport, designed and built to accommodate the service aircraft of over 30,000 American business firms....Sources of alter industrial firms have selected airport sites and the trend is spreading rapidly.⁷

This article presents cost figures for a Class I, Phase 2 airport--the minimum level allowable for FAA approval--suggesting that a town would only have to spend some \$36,000 to be in the running. Such an airport would be, in effect, a public utility run by the town which would garner the profits therefrom.

The Aeronautics Commission of Michigan's Department of Commerce carries on this theme in updating a report in 1970. After an extensive statistical presentation showing the great growth of general aviation in Michigan, it urges:

An airport means a different mode of access to your community. It is an important utility, just as your streets, water, sewer, and power utilities are. Regardless of size, an airport will connect your community to another transportation network located throughout our State and across the nation....With today's rapid changes in transportation, your airport is the

best long-range utility your community could develop. The dollars which flow into your community as a result of a good airport become the dollars of every resident. It will pay taxes to provide future streets and sewers, protection and playgrounds. That is why a good airport may be the best investment your community could ever make.⁸

Again and again in these materials one sees the supporting logic of time saving for executives and the trend toward de-centralization. There is a stock of stories describing dramatic successes in persuading industry to locate or expand in smaller communities. Over and over one sees the attempt to justify the direct expenditure of local and state monies by the indirect stimulation of new sources, jobs and business revenues. The promise is an exchange of limited public expenditures for reduced unemployment and increased public revenues via an expanded tax base.

All this seems heady stuff for communities anxious about the declining economic vigor reported for much of small town and rural America. A local airport financed in large part by State or Federal funds seems like a bargain--*if one believes these claims*. If they come true substantial economic benefits would accrue to these communities. And there would be other rewards as well: Interesting jobs might open up for the young people who now find the larger cities more attractive, potentially exciting new developments in civic projects would be possible, and there would be additional potentially enriching links established with the world beyond the confines of rural areas.

Almost all the persuasive material concerning the impact of air transport and hence airports on communities issues from those who personally have a stake in the development of airtransport technology, very little of it from the smaller communities themselves.⁹ Furthermore, the economic development promised as a potential consequence of increasing airtransport capacities remains almost the sole effect given extended discussion. There is little if any data to support promises of indirect economic effects and very little analysis of indirect social effects which the new transport capacity might prompt. Finally, there is almost no systematic work done which attempts empirically to determine the likely

range of effects of this technological improvement upon the economic, social or political life of smaller communities.¹⁰ Thus what is available, either in the material attempting to promote the technology or in the literature which might be an empirical check upon the logic and assertions of those most profited by airtransport development, lacks both a consideration of the sweep of effect and a rigorous basis for understanding those effects. Without a much firmer basis in reliable fact, the beliefs about airports and economic development make up, in a sense, a body of folklore persuasive to those who want to believe it. Serving to order events and providing a basis for interpreting them, that folklore has lent a rationale to public policies in support of airport development. But as with all folklore, these beliefs are likely to obscure effects incongruent with themselves and to mask other effects not accounted for.

In Chapter One, we nominated a general perspective within which to view the relationships of technology as social activity with other aspects of social and political life. While some suggestive things might emerge from this perspective, it too remains empirically unexamined. It is therefore necessary to develop a much better empirical basis before further advances can be made in ferreting out the various aspects of the impact of technology, in this case airtransport technology, upon our lives. Until this is accomplished, decision makers have only their own intuition, the self-interested folklore, and the interpretations of the industry upon which to make public judgments.

From Folklore to Empirical Expectations

A good deal can be done in distilling, first from the folklore of airports and community development and then from the perspective presented in Chapter One, a set of expected effects stimulated by increased air transport capacity for community life. In so doing, it is important to keep in mind the demands of empirical research, particularly for a situation in which so little systematic work has been done. For purposes of the study reported in this monograph, then, it was necessary to select

one of the three alternative modes of implementing air transport capacity developed in Chapter One above as a starting point.

The Mutually Exclusive model of implementation was selected in order both to gain the advantage of a relatively unambiguous "impact situation," and to speak to a potentially significant policy option for the development of airtransport. This choice was prompted by several considerations. First, the building of airtransport capabilities in rural areas, where airtransport had not previously been very strong, would allow the effects of newly introduced airtransport and airports to be more visible. Second, in small rural areas, the complicating effects of other urban developments would be muted. Third, our efforts could not focus nearly so sensibly on either of the other two modes of implementation: The Competitive mode had already been shown to be potentially disadvantageous on economic and political grounds;¹¹ analysis of the Integrative mode would have required a much more elaborate and extensive research design, well past the resources of the study group.

Air Transportation Capacities and Expected Impacts

Drawing upon the perspective outlined in Chapter One, a concept of the technological capacity delivered to these communities was developed and supplemented with a set of research expectations about the phenomena most likely to reflect the social impact of airport development. In a sense these expectations were the informal hypotheses which shaped the initial phase of the field study reported in Parts II and III below.¹²

The primary capacity delivered by any new transport system is increased physical mobility--the increased ability for people and inanimate objects to be moved. These could be passengers or vehicle operators only, commercial freight, emergency parts and personal gear of one sort or another. Air transportation, then, provides a capacity for physical mobility over fairly sizeable geographic regions, using only the transport vehicle itself and landing site facilities. An aircraft is freed from other physical constraints such as roads or railbeds. Thus, the effects of air transportation will be felt mainly at its end-points with little

direct effect in between. Only the costs and consequences of air traffic control regulation from a region center is involved beyond the resource necessary in the development and operation of the end-points of this system, i.e., the airports.

But the fact of increased rapid, relatively unconstrained physical mobility through air transportation does not, in itself, trigger social or economic change. The triggers are the types of uses to which this capacity is put--or what "flows" through the "airchannel to the end-points."

One way of discussing this is to typify this "flow" in terms of the social meaning attached to the people and objects passing from one end-point to another. These could be characterized as follows:

Trade: the exchange of goods for money or other goods

Skills and Equipment: the provision of needed human or mechanical services

Participation: people going to and from group activities

Requirements: people seeking services, information or new experiences

Affect: emotions and feelings of individuals

Cultural Values: the values and norms "imported" in the personalities of people as they travel about.

There are other types of flow, perhaps, but for purposes of our exploration these were important guides to our work. Clearly a good number of these "things" are transported simultaneously. It is important, then, to gain a better sense of the significance people attach to these different aspects of transportation, for these meanings will have a strong bearing on the likelihood and the character of consequent social impact. The volume and quality of this "freight" and the people associated with it are, in effect, the vehicles of social stimulus. Who they are and the meaning of the new capacity to them become central to discovering the social impact of a new technology.

Viewing technology as a social system suggests a number of aspects not normally included in studies of the social impact of technology. From a community perspective, then, the several likely economic, social,

and political aspects could be important consequences of airport development.

The social organization of the local airport itself becomes an immediate candidate for study. How is it run? Who or what groups are associated with it? What is the social organization of those who own and/or operate planes from it? Two major aspects of the type of social organization interest us. First, to what degree have commitments been made to members of community organizations in the initial construction of the airport's physical facilities and organizational development which constrain further development and/or set the stage for secondary or indirect impacts? Second, to what degree does the character of the airport organization affect the degree to which the capacity for physical mobility is utilized? In general, it is sensible to expect that, if community commitments are within the range of other public activities, the more integrated and effective the airport's social organization, the more likely the airtransport capacity is to be fully utilized.

Political/governmental responses and commitments to the new transportation capacity make up a second area of investigation. Has local government acted to encourage or hamper airport development? To what degree has there been organized support or opposition to its development and continued operation? To what degree has such opposition or support resulted in changes in political status and/or changes in formal or informal leadership positions and activity? It is possible to imagine that successful development of the airport could result in enhanced political and social positions for those supporting it. Airport failure could result in the decline of such status. It is also possible to imagine that the necessity for group action in establishing and operating an airport would increase the overall organizational capacities of a community.

Changes in local economic activity, certainly a central premise of the airport program's promoters, is an effect deserving particular scrutiny. To what degree has there been increased economic activity and expansion as a result of airport development? Has this led to increased or new occupational specializations and/or commercial interdependence? If there has been economic expansion, has this drawn new elite leader-

ship into the community life? If so, what has been its character? Overall economic expansion often results in an influx of new leadership resources in a community with the arrival of new managerial professionals. These people may or may not add to the leadership capability of the community.

In a sense, these three aspects of potential airport impact are nearly first-order effects. That is, they might be more or less directly attributed in part to the existence and relatively full use of the new technological capacity. But there are other conceptually defensible, less direct consequences as well.

Insofar as *airport development is seen as an aspect of more general technological development symbolizing modernity*, we would expect a new airport to be a source of community pride. But if airport developments were a failure or the cause of burdensome financial obligations, this would not be the case. Furthermore, as increased use of air transportation is evident, it is possible to suppose that a community will take on an expanded sense of self awareness and of its regional position.

The aforementioned effects could have several more general and wide reaching consequences. It is possible that increased economic development, travel beyond the local auto-accessible region, and altered sense of community awareness would, if sufficiently developed, result in *changes in some of the social norms* held by significant numbers in the community. It is also possible that as new employee groups settle locally or nearby they would bring different beliefs and values into the community. If the newly expanded industrial firms had employment requirements in excess of local labor resources so that significant numbers of new and strange laborers were brought into the area, this influx of new and different value systems is highly probable. To the degree these effects occur, we could then expect significant *changes in the demographic characteristics of the community*. Thus, patterns of residence, income and employment levels, land prices, educational attainment, even racial composition--all these become candidates for examination. Changes in these characteristics could signal potential changes in the class structure of the community and all the potential conflict and social problems associated with such changes.

Thus, there were a number of expected areas of change or impact that our perspective led us to search for *in whatever site* we chose for testing the empirical utility of our work. The next sections outline the "natural experiment" which became our "testing ground."

OHIO AS A RESEARCH SITE

Informally, we reviewed several possibilities, including California, the Canadian Arctic, Nepal, and Ohio. Considering both its research attractions and its relatively easy accessibility, the recent County Airport Program in Ohio emerged as the best field study situation. Initial reconnaissance suggested that this program would provide a remarkable opportunity for real time-monitoring of the economic, social, and political development stimulated by airtransport in generally underdeveloped areas. The more than 50 moderately small airports established over the past eight years represent an interesting natural experiment involving apparently successful policy implementation, the diffusion of technological innovation, and potentially numerous instances of technology-triggered social change. Ohio's situation became particularly attractive to us because of the very magnitude of the activities carried on in its airport development project, the cooperativeness of the Ohio Division of Aviation, the State's Division of Economic Development, and the College of Agriculture of Ohio State University in making information readily available, and because of the receptiveness of the Ohio communities themselves to an exploratory field study of technology and social change.

Transportation and Rural Life: The Ohio Airport Project in Overview

In 1964 Governor Rhodes began pursuing a major part of his political platform--the stimulation of economic and industrial growth in Ohio. One aspect of the overall strategy was to increase the availability of air transport for business executives in order to encourage them to establish industrial operations in mainly rural, sparsely populated counties. Ohio's eighty-eight counties are distributed rather evenly over

the State, making something of a political checkerboard. By mid-1964 only about thirty counties could handle airplanes at all, and only twenty counties had airports which could handle the small executive jets which require about 3500 feet of runway. Of these twenty counties, ten were serviced by large metropolitan airfields from which scheduled airlines operated. Thus, less than a quarter of the Ohio counties had modern air transport facilities.

To finance development of additional small airports, the County Airport Program was included in a major \$250,000,000 bond issue which in 1965 the citizens of Ohio were persuaded to pass. Of these funds, \$5,000,000 was to be made available to fifty of the sixty counties identified as potential recipients. While the county is not a particularly sensible basis for distributing airports in technical or physical transportation terms, as such it had powerful *political* appeal. In essence, the bond issue made available up to \$100,000 each for counties to upgrade existing facilities or build new ones.

There were two levels of program goals, the manifest ones and those held more quietly by the Ohio Division of Aviation. The official goals were (1) to stimulate industrial development in rural Ohio, (2) to divert significant amounts of general aviation traffic from existing major airfields, and (3) to increase flight safety among general aviation pilots. These objectives are fairly straightforward and to be expected. In a sense, they inhere in the primary capacities of airport and aircraft function. But the intent of the Program did not stop with them. The Division of Aviation had two additional intentions: (4) to enable communities through local leaders to develop greater self-confidence and a capacity to solve their own problems, and (5) to begin regaining population balance between urban and rural sections of the State.

By 1973 there were some sixty-two airports capable of handling executive aircraft on runways at least 3,500 feet long, some with taxiways and lights. The following claims had been made about the program: Twenty-three industrial parks were associated with these airports; a 5% increase in employment, \$250,000,000 in increased payrolls, and 60,000

new jobs had been reported; over 1,500 new or expanded industrial facilities had been built at a capital expenditure of about \$1,000,000,000.¹³ Moreover, a significant decline in general aviation use of the State's ten major airfields was claimed as well as significant improvements in flight safety.

The magnitude of the effort is suggested by comparing Ohio with other states in terms of airports per square mile. Ohio ranks first in order of magnitude, with one airport for every 207 square miles (1:207); California comes next, with a 1:798 ratio, and Texas is third, with one airport for every 1,091 square miles (1:1091). Ohio has been lifted into the air age with remarkable speed and thoroughness.

The field portion of this study was designed to examine the above assertions, to explore the utility of the conceptual perspective developed earlier, and to see if a methodology could be adapted to this manner of examining the impacts of technology upon community life.

Chapters Three and Four provide vivid descriptions of the Ohio County Airport Program and the extraordinary manner of its implementation. But first we will preface that discussion with a brief summary of our entry into the field and attempt to establish a perspective of Ohio's airport program in comparative terms with other states.

Entry into Ohio: Columbus and the Seven Communities

Among the most important strategic tasks of this study were investigating the social, economic and political context of smaller community life and selecting a sample of six or seven smaller communities. Because a good deal of this work had to be done some 2,000 miles away from Ohio in Berkeley, California, the selection process was the most difficult and hazardous portion of our work. For now a brief and general picture of the process and the criteria which were used in the selection of the sample communities will suffice. Chapter Eleven includes an extensive discussion of the methodological considerations and detailed processes employed in the study.

Our original intention was to study some two or three communities to examine the feasibility of using our approach in gaining a better understanding of the impact of technology on social experience. However, because the Ohio County Airport Program proved so rich in detail and possibilities, additional funds to supplement those provided by NASA were procured from the Department of Transportation. But even with these funds, the time which could be spent in the field was limited and as much advance work as possible was required. In effect we had to select the communities from only scant information available in business and trade reports, from information supplied to us by the Department of Aviation and by the Agricultural Extension representatives working out of the College of Agriculture at Ohio State University.¹⁴

An intensive week was spent in Columbus, collecting detailed information about the County Airport Program from its Director, Norman Crabtree. We believed his perception of the character of the various communities would help us in making our selection of a set of counties. Other information was gathered from the State Department of Economic and Community Development and from materials at the College of Agriculture. These data, along with personal briefings from the two men who direct the Agriculture Extension Community Development Program, gave us a broad, somewhat subjective basis for refining our sample of the communities and the design of the study. Of particular interest was the relationship between the fountainhead of the Program--the Division of Aviation--and the communities we would be visiting.

In order to reduce the number of communities from which the final sample would come, we applied several *a priori* criteria. First, only those counties designated at least fifty percent "rural" by the 1970 census would be considered, and only small counties below 40,000 in population and their principal communities might be chosen. As it turned out this latter criterion eliminated only two or three after the "rural" criterion was applied. Also eliminated were several counties which, for one reason or another, had a single large activity, e.g., one very large public works project, which would dominate everything else in the county. After these several factors were taken into consideration

and counties eliminated, some twenty-five counties still remained. From these all but six or seven had to be eliminated. A kind of social science principle of uncertainty entered our procedure. Confident selection of the final six or seven communities could not be done unless much more information about all 25 were available. But to get such information would necessitate on-site visits and gathering a good deal of the information which would be part of the field research itself. This was impossible; yet we were anxious that the sample be representative of the various differences which would give us the most fruitful insights and afford the strongest "test" of our perspective.

Additional criteria were developed, some to increase the representative character of the counties selected, others to ensure variation among them and to afford a look at correspondences with some of the policy assertions of the Airport Program, and others to accommodate more theoretical interests. These criteria were the following:

- Assure geographical dispersion, including counties from both the agriculturally prosperous areas as well as from the poverty-afflicted Appalachian southeast.
- Assure variation in population and employment trends, some increasing and some decreasing.
- Assure variation in apparent patterns of economic growth or decline.
- Assure variation in the degree to which both corporate service and recreational capacities of the airports were utilized.*
- Assure variation in the degree to which local leadership apparently seemed to have been mobilized during the airport development process.*
- Assure variation in the relationships of the airport to the county government, particularly by taking care to include some counties with an Airport Authority and some without such an authority.*

* The information on these variables had to be based on estimates from the Division of Aviation and the Department of Economic and Community Development.

Applying these criteria to the remaining 25 counties reduced the number to a semi-final ten. The available information was collated for developing informal, general hypotheses about each county and its airport. These were used as a guide in quick visits to these ten counties over a long week end. The four team members split up so as to ensure that all ten counties were visited. They interviewed local people in an attempt to gain a better subjective and intuitive sense of what was going on there. On the basis of this combination of often rather gross community level data and hurried local visits, the final list of counties was drawn up. Chapter Six brings together the profiles of the communities and counties as a basis for description of a typical county and its airport program. Chapters Seven and Eight focus, respectively, on the use corporations and recreational flyers made of these airports and the potential indirect consequences of such use.

Finally, a word should be said about the timing of the two phases of our field research, i.e., the study of sample communities and the examination of the Program's operation at the State level and its relations with those counties. Arrangements were made for the detailed and systematic interviewing of State officials to begin *after* the completion of the community study phase. While informal interviews had been done in Columbus prior to more intensive visits to our final set of communities, these were used only as the basis for orientation briefings for the later "headquarters" study. The team member "doing Columbus" then received supplementary questions regarding the particular relationship of the Division of Aviation to specific counties during the construction phase of the airports' development. This was done so that interviews with state officials could be informed by views of the communities regarding the way the Division of Aviation staff conducted themselves at community level. We were interested in the differences as well as the similarities of perceptions between the community members involved with airport development as well as the understanding of these developments held by "the men from Columbus."

Thus far we have tried to orient the reader to the research context and design preliminary to our entering into rural Ohio--in short, the perspective guiding our labors in these small towns. Before we go directly

into the story of the Ohio County Airport Program and the results of our efforts to understand its impact on seven small communities our perspective will be further served by setting it in the context of state aviation programs and operations more generally. To do so will assist in assessing political qualities of Ohio's program. To what degree does Ohio represent a unique situation in airtransport requirements? Are the operations described in the following chapters unusual, or are they more or less normal fare of divisions or departments of aeronautics?

The Ohio Program in Perspective

By choosing to assess an existing rather than a proposed technology, and by choosing to do so in terms of direct human experiences in the field, we necessarily had to concentrate on one particular place and one particular time. Thus limited, we could probe only some of the variations associated with air transportation and social experience; necessarily the degree of variation is controlled by the Ohio setting. Variations from or similarities to programs in other states could not be included in the intensive part of this work, yet without some sense of them the situation in Ohio is severed from an important context. Accordingly, the significance of our results may be affected.

In this section, the focus will be upon aviation in Ohio in the context of state aviation in the mid 1960's and early 1970's--on how typical it has been and whether any factors would modify transference of our findings to another state.

In developing this state level context, aviation officials in other states and headquarters officials of firms that have plants in Ohio were interviewed and FAA and state planning documents, the popular aviation literature, and aviation case studies in Canada and elsewhere were reviewed.¹⁵

Aviation Settings. Even a cursory review of the geographic and cultural settings within North America reveals that many of them present special characteristics likely to make the social consequences of aviation changes rather unique there. Consider these settings:

Northern Canada: The lure of oil and mineral resources is so great that Nordair and other Canadian airlines now have Boeing 707's almost daily carrying businessmen, workers and supplies in and out of towns with populations of only a few thousand persons. The air operation and the resource business in such a case envalues almost the whole town.¹⁶

Alaska: Ground travel in Alaska is impossible much of the time, so air travel is essential. Home of the bush pilot, Alaska is where the residents of small towns are "more accustomed to being around aircraft than being around trucks or automobiles. This leads to casual and unconcerned reactions to aircraft such as one would expect to observe in individuals in other states relative to wheeled vehicles."¹⁷

Idaho: In Idaho the mountainous territory makes air travel so much more preferable to ground travel that flying is the only reasonable alternative. Salmon and Boise, for example, are 340 miles apart by road and 160 miles apart by air. Every town of over 5,000 already has an airport.

Hawaii: Island-hopping in a private plane is delightful; but beyond that the geographic limits on general aviation are obvious, and so too is the special importance of airline travel.

Michigan: Michigan's two peninsulas represent great industrial developments in the south and remote recreational and rural areas in the north. Ground transportation between these two portions of the state can be disproportionately time consuming. Air transport takes on special significance, therefore, for both social and practical reasons.

Each of the states has special geographical properties which encourage the use of airtransport with its peculiar capacities to traverse with relative ease difficult terrain, water, or great distances. In these states aviation developments and subsequent social influences are to be expected and should be quite apparent. But in Ohio, the picture is somewhat different. Its geography affords little encouragement to the development of aviation at the state level. The state is one of the smaller in the midwest, almost a square, 200 miles to the side. It is

virtually flat, having small hills only in the southeastern non-glaciated region. All the forms of communication and transportation that compete with airtransport thrive in Ohio. It has more miles of freeway than almost any other state except California and perhaps Texas. There is ample rail and water transportation as well. Although an enthusiasm for flying has already been established in both city and rural areas, there is almost nothing about the geographical situation of the state that would call especially for assistance from aviation developments in improving transport access.

A state's geographical, cultural, and economic situation are inevitable factors influencing the social consequences of a given change in airtransport capacity. Not so state governments. What they decide to do about aviation has no anticipable logic. "It seems that what a particular department will involve itself in is more according to what the personal biases of the director are than according to what might be most useful to the state's taxpayers, even though those two imperatives will overlap."¹⁸ Surely history and the spending mood of legislatures play their parts as well. As will be seen in the case of Ohio, as compared with other state programs, these factors join with the geographical and cultural setting in shaping the social consequences of aviation.

State Government and Aviation

The declared goals of different state aviation departments, of course, are fairly general, and they begin to sound very much alike after one has read a dozen or so articles and brochures. These emphasize the promotion of aviation, safety, economic development, and coordination of activities. But in practice the emphases do vary. Pursuing economic development means courting industry in Michigan, recreation in Vermont, agriculture in Kansas, or, in Alaska, even the very survival of the communities. Emphasizing safety means emphasizing accident investigations in New Jersey, or in Washington State building navigation systems where the FAA has not built them, as well as the more standard inspection and certification of aircraft.

Matters are not entirely haphazard, however. It is generally understood that the states handle general aviation matters while the Federal government attends to the problems of the scheduled air carriers. A

National Association of State Aviation Officials has been in existence since about 1940, working to keep the states in touch with one another and to work for them in dealings with the Federal government and other groups. But there is great variation in state organization to serve aviation needs.

Two states, Colorado and Nevada, have no formal agencies for aviation at all; some aviation functions in these states are performed by other agencies. A few states, like Kansas, keep a deliberately low profile, in Kansas to avoid offending the airframe industry. At the other end of the spectrum states like Michigan have had a formalized state plan for aviation for many years,¹⁹ California is now integrating its plan for aviation with the state plan for transportation, and Virginia, which a few years ago was providing every imaginable service for private flyers, right down to plastic litter bags for the cockpit, continues to emphasize aviation planning. Clearly, the states must have quite different conceptions of what they are about and different ways of doing similar jobs.

As with state activities in almost any field, the administrative placement of the aviation functions and the sources of funding for them vary also. Aviation agencies are to be found in departments of transportation (California), departments of highways (Michigan), departments of economic development (Kansas), and as independent agencies (Texas). Some of them are headed by multi-member commissions or boards, but in every case the day-to-day responsibility and operating power is vested in one man, usually given the title of Director. Aviation activities in the states have been financed by bonds (e.g., Kentucky), by general revenues from the legislature (Georgia), by fuel taxes (Florida), aircraft registration fees (Massachusetts), or airline property taxes (Minnesota). Ohio uses general-fund revenues and registration fees for its annual operations, in addition to the special bond issue for the County Airport Program.

As sources of funds vary, so does the total amount spent for aviation by the states. The variance is extreme. Consider the fiscal year 1972, for example. Ohio's budget for operating expense for its Department

of Aviation during 1972 was \$240,000. Illinois, which is not greatly different from Ohio in either geography or culture, chose to spend over \$50,000,000 on aviation in fiscal 1972. The state geographically in between, Indiana, had an aviation budget that was not at all financially in between--\$86,000. Idaho has more need for aviation, considering geography at least, than Wisconsin; yet it spent significantly less on aviation in 1972. Table 2-1 shows aviation budget figures for these and other states. The point of all this is simply that there is extensive variation in the size and effort of the departments, and that the variations are not easily explained on the basis of one or two dimensions.

Most of the states spend some of their money on aiding local airports. Wisconsin requires by statute that there be a public airport in every county, and the Texas Aeronautics Commission has set itself the same goal. Some of the states have full-fledged state plans for a system of airports of various kinds and sizes; other states work along incrementally with what they can get from their legislatures. Ohio, which made a big push with the county airport program, is now joining the ranks of the planners, with a state airport plan required by the U.S. Department of Transportation.

TABLE 2-1
STATE BUDGETS FOR AVIATION*

<u>Ohio and Neighboring States</u>	<u>FY72 Aviation Budget</u>
Illinois	\$54,804,000
Michigan	1,200,000
South Dakota	841,000
North Dakota	427,000
Ohio	240,000
Indiana	85,000
<u>States with Special Characteristics</u>	
Hawaii	23,630,000
Alaska	11,045,000

Texas	1,505,000
Alabama	1,082,000
Wisconsin	450,000

* Source: "What the States Can Offer Aviation," *Airport Service Management* (May, 1973)

In aiding the local airports, most of the state governments offering assistance restrict themselves to construction and financial aid related to the runway and the navigational facilities. There is generally very little aid given for the construction of buildings or for technical and managerial assistance to airport operators. Day-to-day management of the airports is almost always left up to the locality, which may decide to manage the airport publicly or lease management rights to a private party. Alaska, where the state itself runs almost all of the 1,000 or so airports, is a major exception to this rule.

One common factor among the states is a distaste for Federal involvement in airport planning and general aviation. Some, such as Ohio's Division of Aviation, are adamant in their opposition to FAA procedures and organizational style. Although most of them can get along well enough with the FAA, the feeling remains that, as one state's Director put it, "We do the same things, only better...we can make decisions and get work done in less time with less wheel-spinning." A particular bone of contention has been the inapplicability of the FAA's single set of airport design standards to the variety of climatic and geographic conditions in the various states. A recent decision to decentralize some of the FAA's airport assistance functions has been widely hailed among the states.

A summary view of Ohio is in order. While state aviation programs vary widely, Ohio is not unusual among them in the range of size of its actual government programs in aviation, although its Director has kept it on an independent course. For our purposes, Ohio is a state where

the social consequences of expectable changes in aviation capacity are not likely to be as great or as extensive as in other states.

In a sense, then, airport development in Ohio could itself be seen as an extreme case, one with minimal geographical incentives to airport development on a grand scale. In the face of such a situation, adopting a "null hypothesis" approach of *no effects* is sensible. It also suggests that if any effects are observed, they would be all the more remarkable. Ohio then becomes a kind of test case for the influence of airtransport upon rural areas. If there are any effects in Ohio one can logically expect a greater degree of impact in other regions where the geography and competitive modes of transportation make air transportation more desirable.

Summary of Part I

The chapters in Part I are intended to set out both the conceptual and the research contexts of this study-in-demonstration. Moving from the quite abstract and general to the more particular, Chapter One presented a conceptual perspective of technology as a social system, related this perspective to a particular technology, airtransport, and provided a rationale for entering into a field exploration of the impact of an aspect of improved airtransport capacity upon small communities--airport development. Chapter Two presents the more particular context of the airport program in Ohio, the logic that supports such developments, as well as the particular conceptual rationale for our work and the methodological stance informing our entry into the world of airtransport at the rural county level. The choice to go to smaller communities in rural areas (a choice incorporated in this study at its outset) pitches the study at probably the minimum threshold of impact that airport development can have on communities. Thus, the study is at the far end of the spectrum from those examining the controversy surrounding the development of the giant airports proposed and being built in the United States. We are working in small social systems, attempting to track the impact of what was a development of relatively small size in communities which were little affected by urban growth.

The study reported in Parts II and III will attempt to assess the utility of the conception and perspective outlined in Chapter One for improving the information required to enhance the quality of technology assessment more generally. Part II deals with the somewhat extraordinary process as the state of Ohio actually implemented its intention to distribute airports about rural Ohio. In some respects it is the story of a remarkable success in policy implementation. In others, the outcome is not clear. The perspective shifts in Part III to the communities. What were they like, these receptors of technological impact? What were the variations among them that would shape the particular impacts of airport development? Were the hopes for economic development stimulated by a new airport borne out? What were the conditions associated with industrial use of this new technological capability? How did the airport development affect the sub-culture of recreational flyers located in these communities? Does a change in that sub-culture make a difference for the communities in which it exists?

With these questions framed in the context of our perspective, we enter the world of flying in rural Ohio.

NOTES

¹*Flying*, April 1971, V. 88, no. 4.

²*Ibid.*

³GAMA, "The Economic Importance of Airports and General Aviation," 1971.

⁴GAMA, "An Airport is...a Growth Industry" 1970. p. 3

⁵*Ibid.*

⁶G. E. Ascher, "A Municipal Airport Aids Business Development," *Minnesota Municipalities*, 49 (March, 1964), 59f.

⁷"Your Airport and How to Get It!" *Texas Town and City*, (March, 1964) 12014, p. 20.

⁸Michigan Aeronautics Commission, *Aviation and Economic Development*, (February, 1970), pp. 21, 23.

⁹There is a small literature concerning the negative impact of airport construction and airport noise, but this is almost exclusively associated with very large jet ports development in heavily urbanized areas. See especially *Community Reaction to Airport Noise*, TRACO (TD No. T-70-AU-7454-U) for Bio-Technology and Human Research Division, N.A.S.A., September 1970.

¹⁰J. Scalea and R. Simpson, *A Critical Analysis of the Economic Impact of New Airports in Ohio*, Flight Technology Laboratory (FTL Technical memorandum 73-5) M.I.T., March 29, 1973, attempt to counter the combined impression of two reports from the Ohio Department of Commerce and Development: *A Preliminary Report of the Economic Impact of Ohio's Airport Development Program*, July, 1970, and *A Study of the Economic Impact of Selected Airports Generated from the Ohio County Airport Development Program*, September 1970.

¹¹See La Porte et. al, *A Perspective in the Assessment of Large-Scale Technology: The Case of the STOL Aircraft Transport System* (IGS Progress Report to NASA-Ames, November, 1971), esp. pp. 60ff.

¹²Much of that work draws on the preliminary work of J. Forester and S. Rosenthal reported in T. La Porte, et al., *Social Change, Public Response, and Regulation of Large-Scale Technology--Questions in the Social Assessment of STOL Airport Transport*, (1972), Ch. 2. Some other material does attempt to explore the social impacts of transport though none of it employs conceptions refined to the degree reported here. See D. Appleyard, "Social and Environmental Policies for Transportation in the '70's, University of California, IURD working Paper no. 161 (November, 1971); *GWU Program*, "Social Impacts of Civil Aviation and Implications for R&D Policy" (September, 1971); M. Farber, "Some Hypotheses on the Psychology of Travel," *Psychoanalytic Review* 41 (1954), p. 267; M. Krantzberg, "The Social Impact of Transportation Technology, a paper for a conference sponsored by the Connecticut General Life Insurance Co., (May 1963); M. Moline, "Mobility and the Small Town, "Report no. 132, Department of Geography, University of Chicago (1971); Pfeiffer, "Social and Economic Impact of Turbo-Prop and Pure Jet Aircraft in the Eastern Arctic", paper given at Ames Research Center, Winter 1973; Sealy, "Air Transport in Underdeveloped Areas," TRACOR, *Community Reaction to Airport Noise...*; Webber & Angel, *The Social Context for Transport Policy*, a report to the Committee on Science and Astronautics of the U. S. House of Representatives (Washington D.C., 1969)

¹³See Note 10.

¹⁴The assistance of the faculty and staff of the College of Agriculture, Ohio State University, was simply indispensable. Their interest and graciously offered help enabled us to gain an extraordinary orientation to the particulars of Ohio and its rural culture. Perhaps the time spent with Allan Gehers and Allan Pugh, in charge of the community development work for the Agricultural Extension Service, is the most memorable part of that experience. From their long experience and deep reflection about rural Ohio, they provided us with a superbly integrated and insightful orientation to the culture of small town Ohio. We deeply appreciate the interest and contribution of these two men dedicated to the people of rural Ohio.

¹⁵The review process included the following activities:

(1) Telephone or personal interviews with state aviation officials in Alabama, Alaska, California, Idaho, Kansas, Michigan, Texas, Washington and Wisconsin. In several cases the officials forwarded materials for our examinations.

(2) Articles in popular aviation magazines and state municipal league publications pertaining either to the programs of individual states or to state aviation generally. On the latter subject two articles were most helpful: Robert Hoffman, "Your State Aviation Director--What Has He Done for You Lately?" *Flying*, May 1971, p. 81; "What the States Can Offer Aviation," *Airport Services Management*, May 1973, p. 23.

(3) Aviation case studies in other locales. Among the studies reviewed were: K. P. Pfeiffer, "Social and Economic Impact of Turbo-Prop and Pure Jet Aircraft in the Eastern Arctic," paper presented at NASA Ames Research Center, October 26, 1972 (Montreal; Nordair Ltd., mimeo, 1972); Kenneth R. Sealy, *The Geography of Air Transport* (London: Hutchinson University Library, 1966); and other works.

(4) FAA planning documents, including among others *Planning the State Airport System*, Advisory Circular 150/5050-3A, June 1972.

(5) Telephone interviews with the aviation directors of six corporate headquarters in cases where the corporation used one of the county airports but did not base a plane there.

¹⁶ See Pfeiffer, *op. cit.*

¹⁷ Jack Peck, Director, Alaska Division of Aviation, personal communication.

¹⁸ Hoffman, *op. cit.*, page S4.

¹⁹See, for example, Michigan Board of Aeronautics, *Michigan Airports*, February, 1944; and Michigan Aeronautics Commission, *Michigan State Airport Plan (1970-1975)*, April, 1971.

PART II

POLITICAL RESOURCES, ENTREPRENEURSHIP AND COMMITMENT TO AVIATION: THE DIFFUSION OF TECHNICAL CAPACITY IN THE OHIO COUNTY AIRPORT PROGRAM*

From 1966 to 1970 the state of Ohio carried out a modest revolution in state aid to general aviation. Working with a bond issue of a mere \$5 million, supplemented by a miscellany of public subscriptions and contributions in kind, the state and local governments built over 50 general aviation airports in rural parts of the state. A subsequent construction and upgrading program, more limited in scope, provided for lengthening of runways to accomodate heavier business aircraft, including jets, and for added ground equipment. In all, the magnitude of technical accomplishment on so small a budget was astounding. At Bolton Field near Columbus, a general aviation airport built by the Federal Aviation Administration during the same period, the federal government spent \$5 million for a single-runway airfield providing aeronautical capabilities only slightly superior to *each* of the more than 50 county-airports

In Parts II and III of this study, we shall describe the county airport program as it came to life both in state government and in the communities. We shall look at the program from four different, though overlapping perspectives: from the vantage of the State government (Part II) and from the perspective of local governments and communities, business corporations using the new airports, and recreational fliers (Part III). Although each set of actors saw the airport program from a coherent point of view, there are notable divergences among the four groups about what the program did and how well it accomplished its direct and indirect objectives.

* Based on intensive field work in Columbus, Ohio, in the summer of 1973, the three chapters comprising Part II have been contributed to this study by Dr. K. N. Lee, Assistant Research Professor, Program in the Social Management of Technology and Department of Political Science, University of Washington. An invaluable party to this project from its outset, Dr. Lee was a member of the field study research team visiting Ohio.

The county airport program provides a case-study example of various dimensions of technology outlined in Part I. Of particular importance for the reader steeped in a technological tradition is the fact that our analytic approach focuses upon technology as *social organization*. We shall adopt, accordingly, the unfamiliar perspectives of social science to examine the ways in which the concepts, machines, and structures of general aviation, airports, and economic development generally provide opportunities and occasions for human action. Perhaps because of the small size of the Ohio airport program, the case study it provides is unusually rich in vivid individual initiative and character, particularly in the person of Norman Crabtree, Director of the Ohio State Division of Aviation (DOA). As we shall argue later, the very large role played by personality and individual drive makes of the Ohio experience a remarkably clear case in point illustrating that technology is rooted in simple, lively human experience. Several of Ohio's other State-level programs are discussed as we attempt to explain, in simple terms, that readiness to seize opportunity which made DOA's approach to the initiation and implementation of public policy somewhat unique.

CHAPTER THREE

CRABTREE AND THE GRASS ROOTS· THE BEGINNINGS*

We begin with the view from the center, the Ohio Division of Aviation, the state office which lobbied for and then administered state funds for the airports. The county airport program should be seen in the context of Ohio's economic and political setting during the mid-1960's, when Republican James A. Rhodes served as governor. The accent was on growth and economic development in the Rhodes administration, and the DOA staff saw the airport construction program as an integral part of that theme. Accordingly, although DOA tried to keep its role technical and nonpartisan, the implementation of the airport program was permeated with activity which was political, in the most general sense of the word. Initially, the idea of the airports and their relationship to boosting economic development had to be sold to three distinct audiences: the governor, the legislature, and the counties. Even after the idea was adopted--often with enthusiasm--there remained the problems of building the airports, and here too DOA provided important, if intermittent institutional and political assistance. "Political" is to be sharply distinguished from "managerial," however. DOA officials, particularly agency director Norman Crabtree, continually emphasized in word and deed the necessity for local communities to comprehend and to take principal responsibility for the airport. Though often expressed in technical aeronautical or business terms, there was a political value commitment infusing government policy, a commitment to building local community autonomy.

THE SETTING

Ohio's county airport program was born in the mind's eye of Norm Crabtree, as he traveled the state early in the 1960's as a pilot and

* Contributed by Kai N. Lee

aeronautical inspector for the DOA. The idea of upgrading the helter-skelter "flying farmer" airfields in the rural areas of the state took shape in the political setting of the Rhodes administration and in the organizational setting of DOA and its partner agencies in the airport program. Thus, the fact that the airport funds were disbursed to *county* governments had a basis in political power and representation patterns, rather than aeronautical logic.¹ Even more important, the rationale for the airports--that they would be an integral part of an economic development effort for rural Ohio--reflected the pro-business inclinations of the Rhodes administration. It is fruitful, then, to approach the county airport program, not merely as the working out of some technological imperative, but as an element of a broader--though not tightly coordinated--scheme of political development.

"Profit Is Not a Dirty Word in Ohio"

In the period following World War II, Ohio was in many ways a microcosm of the United States. Ohio experienced a strong expansion of productive capacity as the state, already an industrial center of the Old Northwest, became an industrial hub serving the East Coast and the Midwest. Industrial growth was accompanied by urbanization, especially along the corridor from Cincinnati, in the southwestern part of the state, to Cleveland in the northeast. The agricultural northwestern region continued to prosper, and the non-glaciated mountainous southeastern Appalachian foothills continued the economic and demographic decline which modernization and the Great Depression had begun. Although there were sour notes, the dreams and optimism of postwar America were reflected in the economic growth of Ohio, where in many ways they were being fulfilled.

By the late 1950's, however, the postwar boom showed signs of slackening, as the industrial economy of the Eastern United States matured and edged toward senescence. Capital equipment, built during and after the war, was aging. The steel plants in neighboring Pittsburgh, overbuilt during the flush early fifties, were operating below capacity.

Capital spending, and the growth it would have brought in its wake, was going elsewhere. One alternative was the Southeast--the New South, as the recruiting brochures of the day referred to it, where property taxes and labor costs were both well below what they were in the North. The outlook for the future, in Ohio at least, was not as bright as it had been a few short years earlier.

The maturing of the Ohio economy was itself partly to blame for the economic problems which became apparent in the late 1950's. While industrial capacity had been built up, so had the political capabilities of the workers who labored in the factories. Minimum wages, health and safety codes, workmen's compensation, and much other occupation-related social legislation--most of it at the state level--had combined to drive up the costs of doing business in Ohio. While the price of labor was going up, so also were the costs of caring for the unemployed and unemployable. As had happened for many of the cities of the industrial North, many more people--including Southern blacks--had been drawn to the cities than could successfully be assimilated into urban economies. Today, more than a decade later, the problems of welfare and urban social services still loom large.

In the 1962 midterm elections of the Kennedy Administration, Republican James Rhodes was elected governor of Ohio--long a predominantly Democratic state. In a sense different from Kennedy's, Rhodes too took his election as a mandate to get moving again, and his energetic pursuit of that aim was to carry him through a second term, which ended in 1970. That mandate was in large measure directed at protecting and expanding Ohio's share in industrial and economic growth. In the context of the nation as a whole, Ohio fared well under Rhodes' stewardship, though it is important to note that, for all the fears of economic decline inspired by the 1958 and 1962 recessions, the 1960's turned out to be a boom period unparalleled in American history.

The Rhodes style, like that of DOA, was personal and pragmatic. Though cautious about the growth of government, Rhodes did not hesitate to expand government spending for programs in which he believed--including the county airports. When Rhodes entered the governor's office, he

brought into state government a group of loyal and energetic associates, many of whom stayed in office throughout the eight-year Rhodes administration. The common trait of the Rhodes circle was an unwavering faith in economic prosperity as the principal objective of state policy.

Fred Neuenschwander, a plain-spoken businessman who once served as president of the Wooster, Ohio, Chamber of Commerce, exemplifies this strand of Republicanism. Neuenschwander is now executive vice president of James A. Rhodes Associates, a business consulting firm staffed largely by principals of the earlier Rhodes administrations. (When we were conducting our interviews, Neuenschwander, like the rest of his colleagues, was beginning to point toward the 1974 gubernatorial campaign, when Rhodes would make a try to regain the state house.) Back in 1963 Rhodes created a new cabinet-level Department of Economic and Community Development, and named Neuenschwander to head it. DECD was the action arm of the government in economic areas generally, the Department of Commerce, which had responsibility for regulating business practices, was quiescent--not to say moribund--by comparison. The governor himself poured much of his personal energies into recruitment of new business for Ohio, and DECD housed the staff for the recruiting effort. Consistent with Rhodes' and Neuenschwander's personal style, DECD teams, often led by the governor or agency head, would go out to visit corporate officers contemplating new plants in the state. Usually, the recruiters were flown to their appointments in DOA aircraft--occasions, it turned out, when DOA could do a little recruiting of its own.

Neuenschwander shares Rhodes' faith in free enterprise. Businessmen, he asserts confidently, employ the work force, and employment is the most vital component of social well-being. More to the point, an administration which permits large rises in unemployment is not likely to do well at the polls. This is a palpably Rooseveltian view of government,² though the label may seem odd, in that it sees government devoted more to the positive management of the economy than to any simple notion of enforcing standards of fairness in economic and other social transactions.³ The point is illustrated by some facts approvingly cited by Rhodes Associates. It takes \$250 million, they note, to support

100,000 unemployed persons for a year. Those same 100,000, would, if they worked, pay about \$75 million in annual taxes. A change in employment figures, or in the unemployment rate, is therefore an important guide for public policy. In sum, jobs are a key element of the public interest, and businessmen are the key to jobs.

Under Rhodes' direction, the Ohio government launched and carried out a number of major economic programs. One of these, the recruitment of industry to Ohio, is especially relevant to the county airport program. But recruitment was far outranked (in fiscal terms) by the programs in education. (Because the vocational education part of the overall educational development program was explicitly linked by state officials to the industrial location effort, we shall have a closer look at vocational education in Chapter Five.) Smaller programs to promote tourism, particularly in the Appalachian southeast, and to improve the financing of small business, were also instituted.⁴ These programs were carved out of existing state commitments.

During the Rhodes years, state government bureaucracy grew very slowly; even today, Ohio has fewer governmental employees per capita than any other state. This enthusiasm for limited government has, of course, a fiscal counterpart: during the eight-year Rhodes administration, only one tax increase was passed--and that was a sales tax. The pro-business and pro-development bias was a thorough-going one; a sales tax, a Rhodes colleague conceded, could hardly be described as "anti-business," while the workmen's compensation acts of the 1950's definitely were.⁵

But if holding down taxes was the order of the day, that was not the same as fiscal moderation. The Rhodes programs tended, as in the airport program, to lean toward capital construction: highways were built at the awesome pace of \$400 million per year during the 1960's; a vocational school facilities program, the heritage of the Rhodes spirit, will lead to nearly \$500 million worth of new construction over the next several years. Large capital-improvement bond issues were passed several times during the 1960's; the county airport program was part of a \$250 million set of bonds ratified in 1965. Bond issues

seemed so popular, indeed, that bond monies were even used to pay for noncapital expenses, including staff salaries in several instances.

This mode of paying for government was not without consequences, however. The bonds, some of which will not be retired until the 1990's, have seriously cut into the state's credit, so that further expansion of governmental services will have to be paid for through expansion of the general fund--that is, through tax increases. The Democratic Gilligan administration is currently proposing personal and corporate income taxes; not, of course, a politically popular move. But critics of the Rhodes administration question whether, even if Rhodes had been succeeded by a Republican, this step could have been avoided. The expansive policies of the 1960's have put a short, tight leash on state government in the 1970's, when the need for social services may mount even higher and faster than was the case a decade earlier.

But Rhodes supporters take an optimistic view. What counts, they argue, is the record of achievement, and they cite several trends with pride.

- *unemployment* declined from a sickly 6.2% in 1962, to a healthy 1.8% in 1969, Rhodes' last year in office. (Other observers note that 1962 was a recession year, 1969, a boom time.)
- *highway construction*, both an important economic activity in its own right and an indicator of the industrial infrastructure in the state, flourished, as noted above, during the 1960's Ohio spent \$400 million annually on highways, and was, at the end of Rhodes' tenure, closer to completing its Interstate Highway Plan than any other state, with 94% of the roads planned already completed. Others note that 90% of the highway money is supplied by the federal government--but the point is, nonetheless, that, *comparatively*, Ohio built roads rapidly.⁶
- *industrial recruitment* also did well, though a reliable statistical measure is hard to come by. Critics note that, while Ohio grew, it did so less than the other Great Lakes states, only the auto industry made a major new commitment to Ohio during Rhodes' tenure.

- *labor union* support for Rhodes continued strong, consistent with low unemployment and the rise in industrial production generally. Although each element of this record is open to challenge, there is little doubt that Ohio prospered economically during the 1960's, and no doubt that Rhodes and his men were trying hard to have this happen. In this sense at least, the Rhodes administration's recruiting slogan, "profit is not a dirty word in Ohio," seems to have been a fair reflection of state policy. But assigning credit--and blame--for what actually happened as a result of state activities is a much subtler matter, as we shall see.

The County Airport Program

Against the larger canvas of the Rhodes administration's efforts to keep the Ohio economy growing, the county airport program is a mere detail. The DOA conception of general aviation as part of a transport and communications network for business executives was certainly congruent with the development aims of DECD and the Governor. Yet it is difficult to demonstrate that the county airports were ever an integral part of the state development program.

Even now, well after the construction of the airports, DECD is only just beginning to include them in a systematic way in its planning efforts. Yet DECD was, from the inception of the Program, the principal link between the county airports and economic development. Looking elsewhere in the state government, one searches in vain for unambiguous evidence that the county airports were part of a coordinated attempt at economic development.⁷ Significantly, the questions we now raise about the link between program and consequence, between cause and effect, are almost wholly irrelevant to the considerations which actually shaped the airport program.

The county airport program was authorized by the voters of Ohio in the general election of 1965. Cast as a \$5 million allocation in a \$250 million omnibus bond issue, the airport plan benefited from support both by Governor Rhodes and the state legislature. Five years

later, that \$5 million had blossomed into 50 airports in rural Ohio. The real political story of the county airport program, of course, had mostly unfolded before the time the bond issue was even proposed.

When Governor Rhodes named Norman Jones Crabtree director of DOA in 1963, he may have sensed a kindred spirit in his new appointee. Both have similar rural backgrounds. Crabtree grew up in Jackson County, in southeastern Ohio, and as a boy he dreamed of flying. A bomber pilot in the Second World War, Crabtree returned to Ohio State to study, eventually earning a master's degree in education and psychology. But in the 1950's, when a job opened up at DOA, the lure of the sky caught up with him again. The years in counseling psychology were not wasted, however, as Crabtree's gifts of sensing others' anxieties and responding to them were to be called for frequently as the county airport program developed. But Crabtree's closest affinity with Jim Rhodes is that both are extraordinarily energetic and effective entrepreneurs. Tall, intense, but casual and nondirective in manner, Crabtree is a man of opinions, all of them unabashed. Yet this readiness for debate is always intertwined with the negotiator's sense of conciliation.

By the time he was appointed to head DOA Crabtree already had well-developed ideas about the needs of general aviation. DOA Assistant Chief John Cornett, who had just joined the agency then, recalls that even Crabtree's earliest public statements about airport development make clear his belief that airports are linked to economic prosperity. Thus in addition to an aggressive style like Rhodes' own, Crabtree shared his enthusiasm for economic development. That Crabtree managed to get a working program approved within two years of his appointment to the directorship is, by the standards of bureaucratic government, testimony to the remarkable persuasiveness of the man--and to the favorable access he had to Governor Rhodes.

As chief pilot of DOA, Crabtree personally frequently flew the Governor on official business. Tirelessly preaching the gospel of general aviation and economic development, Crabtree soon convinced Rhodes that a trial run in airport development was sensible. John Cornett still recalls with excitement the evening in 1964 when the Governor

called. The airport program, Rhodes said, would be included in the next capital improvement bond issue, and he wanted Crabtree and Cornett to come to his office in downtown Columbus to rough out a plan for spending \$5 million. That night, Crabtree and Cornett worked past midnight with the Governor, on the plan which, as it turned out, was later approved.

With the passage of time who suggested what has become obscure-- but the plan bore signs of incredible technical bravado, together with a judicious dose of pork-barrel shrewdness:

- the program was to be directed at the 62 counties of Ohio's 88 which had facilities inadequate to handle multi-engine general aviation aircraft. In short, the program was aimed at bringing rural Ohio counties up to a standard which Crabtree considered minimally decent.
- the basic concept was a single, paved runway, 3,000 feet long. Although by law the state could not buy the land, the state grant would pay for most of the construction costs for the runway. Anything else was to be at the option of the local community.
- the \$5 million was arbitrarily divided up into 50 grants of \$100,000 apiece: enough to reach most of the counties, and, if things worked well, DOA could go for more funds. (Eventually, it did, making follow-up grants of \$50,000 to some of the airports built during this initial phase.)

The most striking feature, of course, was the arbitrariness with which the grant figure of \$100,000 was arrived at. Crabtree and Cornett briefly considered raising the per-county grant to \$200,000, spreading the bond money over only 25 of the 62 counties eligible. This plan was rejected as "unfair." Certainly it would have been more difficult for DOA to avoid charges of favoritism if they could only grant half the requests.⁸ But it was the better part of optimism, at this early stage, to think that all the eligible counties would actually apply. Crabtree did not seriously consider asking Rhodes to raise the allocation from \$5 million, since that would have required slicing away part of another

program in order to stay within the \$250 million total for the bond issue.⁹

These two political circumstances--a rigid limit on the overall sum to be spent, and a need to parcel out the funds with manifest fairness--usefully illuminate the limitations of "rational" program planning.¹⁰ Where a rational planning approach would probably have suggested a staged sequence of program steps, the constraints of political feasibility elicited a qualitatively different policy design. From the planner's perspective it would have been sensible to draw up a statewide master plan for airport development--probably including the larger fields serving commercial air carriers as well as general aviation. Then a small number of counties could be designated first-priority target areas for airport construction. If these worked out well, additional funding would probably be sought.¹¹ But even though he was a fervent believer in the need for county airports, Crabtree recognized that the opportunity to fund a construction program might not come again. Accordingly, the first grant would have to be treated as the only one, so far as designing the *political* aspects of the program was concerned. Thus it made sense to divide the money into enough packets that counties would not fight for priority, it made sense to adopt a "first come, first served" rule to ensure impartiality--and lack of controversy.

As things turned out, the airport program was fabulously successful from a political standpoint. As the two-year spending period for the initial \$5 million grant drew to a close, there was a sudden flurry of interest from the counties which had been slow to participate. But there was too little money left to honor their requests. Crabtree and his staff agreed to give it one last try, going before the legislative appropriations board in charge of overseeing bond money expenditures. Luckily, several board members were state legislators from "deprived" counties. The board agreed to divert \$1.2 million--appropriated as part of the same \$250 million bond issue--to provide funds for up to 62 airports. The extra money came from an allocation for the improvement of state offices, including air conditioning those of the state legislature. Even after this perspiring generosity, there was no let

up in pushing the airport program. In the end, only four counties remained uninterested in, and did not acquire, airports. All who had sought aid received it.

Spreading the money thin provided an opportunity for Crabtree to carry out his "hidden agenda." Like Governor Rhodes, Crabtree has always been wary of "big" government. He saw the county airports as an occasion for state government to devolve its responsibilities down to the local level, where responsible officials are presumably in a much better position to exercise their responsibilities. The successful delegating of state responsibility depends, however, on the lower governmental level having a stake in its new powers. For a highly specialized facility like an airport that would not be easily found. It would be far easier to let a special interest group--local pilots, or perhaps a business which uses general aviation--usurp the airport to its own narrow ends. But if the state grant for airport construction were insufficient, then the local businesses and residents would need to make up the difference. This, Crabtree saw, could be turned into an opportunity to create a community stake in the public-spirited use of "our own" airport. As the field studies show, this vesting of a public interest was sometimes successfully carried out, though the results were decidedly mixed.

Measured against this political goal, the lack of overall coherent planning may be a relatively minor cost. Its plainest manifestation is to be found in two adjoining counties which refused to collaborate; they now have two airports within five miles of one another. More subtly, the level of community contribution needed to complete construction turned out to be quite variable; that inequality would probably have been caught by a well-designed master plan.

By their own account, Crabtree and Cornett had no idea how much airport \$100,000 would actually buy. Incredibly, the DOA grants were not nearly as far off the mark as one would have thought at first. As Crabtree says with some pride, Columbus' new general aviation "reliever" airport, Bolton Field, was designed and built with Federal Aviation Administration funds, to FAA standards. Although Bolton has only a

single 4,200-foot runway--the same capability as DOA's upgraded design for county airports--the airport cost \$5 million. The whole county airport program, which produced 50 airports, cost roughly the same in capital outlay. But this is recent information, at the time the bond issue was written, a cost estimate of two per cent of the going cost of a general aviation airport would have been regarded as ludicrous--and it was.

The Rhodes-sponsored capital improvement bond issue, promoted on the basis of its support for additional road building and recreational development, was handily passed by Ohio voters in November 1965. After the bonds had been approved, the state legislature had to appropriate the funds before they could be spent. It was here that Crabtree faced his largest political challenge.

While Crabtree and his staff were testifying before the legislature to justify the airport program, a letter arrived from the FAA, commenting on the program. FAA officials pointed out that the sum to be allocated per airport facility was, by any historical standard, absurdly low. In consequence, Washington recommended that the program be terminated before Ohio wasted \$5 million. Crabtree, infuriated by what appeared to him to be a betrayal by professional colleagues, proposed an extraordinary wager to the legislators. Give DOA two years to make good on the airport idea, he asked. If by that time the program was floundering, Crabtree offered, the whole DOA staff would resign. The legislators, presumably preferring to believe in Crabtree's stubbornness rather than the technical expertise of distant federal officialdom, accepted the wager. One supposes the FAA knows it has lost the bet.

What made Crabtree's wager unusual was not that he offered to make the DOA accountable for its activities; however rare in fact, the ability of public officials to deliver what they say they will is hardly the sole criterion on which public policy is made. The point of the melodramatic two-year deadline, instead, was that Crabtree was promising to do an ambitious project *over and above* DOA's mandated mission. Putting an agency's survival on the line for something which is *not* its nominal responsibility is something not often found in any organizational

setting, let alone government bureaucracy. We see it, rather, in the assertive confidence of the independent business entrepreneur. The question arises, then, whether Norman Crabtree is simply an aberrant state employee, or if the organizational setting of the DOA played a significant role in his ability to gamble, and win, on the county airport program.

The Organizational Texture

DOA's organizational setting, in combination with Crabtree's unusual energy and entrepreneurial skills, contributed significantly to the successful outcome of the airport program. And it is precisely because the DOA's organizational features make Crabtree's role easier to identify that we have chosen here to emphasize those features. The small size of DOA, however, foreshortens the view of the organization as the lengthened shadow of its leader. While DOA and the political context provided a critical opportunity, it was one which needed still to be seized; and it was, by Norm Crabtree.

Before Crabtree was appointed DOA director in 1963, the Division had been a regulatory, educational, and special services agency for aviation affairs in the state. Administratively housed in Ohio's Department of Commerce, DOA was charged with the inspection and licensing of aircraft and airports in Ohio, playing a role somewhere between the department of motor vehicles and the department of highways. As was traditionally the case for state aviation agencies, DOA was concerned primarily with general aviation, even though in a few respects its official responsibility extended as well to the certificated carriers.¹² Beyond the licensing function, the previous director, an astronomy professor from Ohio State, in the wake of *Sputnik*, started a modest program of public education in astronomy and space exploration.

The most important political function of the early DOA was as a chauffeuring service, as Crabtree was to discover. Although functionally irrelevant from a bureaucratic point of view, DOA was given the responsibility of flying state officials who had urgent or important business

to their destinations, when alternate ground or commercial air transport was unavailable or inappropriate. In particular, this meant that the governor--whose business, however routine, was always important enough to rate private flying--came to know DOA staff as pilots in an informal way.¹³

Three characteristics of the DOA, all actually or potentially available to Crabtree when he became director, proved to be instrumental in the decision to build the county airports. In turn, each of these characteristics set important constraints upon DOA's ability to implement the program--constraints which called forth further technical and political innovations. The three salient features were regulatory mission, organizational structure, and informal contacts with important state officials.

During the Rhodes administration, as noted earlier, business was cordially regarded by the executive. Accordingly, the licensing and inspection mandate of DOA, potentially an entry point to vigorous regulation of intrastate air transportation, was exercised at an adequate, but hardly maximal, level. The point is *not* that regulation was *technically* lax, but only that the administrative surveillance of the business aspects of general aviation seemed to be based upon the assumption that the competitive market was a sufficiently harsh taskmaster to enforce proper behavior.¹⁴ The enforcement of safety standards for general aviation, an area in which technical factors play a much larger role, has been, and remains, a mainline concern of DOA. Indeed, the county airports were advocated in part because they would improve landing and takeoff safety and also decrease congestion at airline hub airports. In sum, the central official operating mission of DOA, licensing and regulation, comprises tasks which can be executed routinely. For someone of Crabtree's personal energies and organizational abilities, this meant there would be slack left over for other interests.

For the Ohio DOA, as for most state aviation agencies, there is a second responsibility explicitly written into its charter: the promotion of general aviation. Here, the activity of the agency has been shaped to the realities of general aviation as a social system. As

numerous observers have pointed out, the term "general aviation" encompasses a broad set of people, purposes, and interests,¹⁵ both the Sunday flier and the business-jet pilot fit under the broad umbrella of general aviation. Accordingly, there have been few common interests uniting the various segments of the general aviation population.¹⁶ The "promotion" of such a diverse set of interests could therefore take many different forms--at the discretion of the aviation director.¹⁷ In Ohio, both the astronomy-centered interests of the early 1960's and the county airport program could easily fit under the rubric "promotion." Given the stress put on economic development in the Rhodes administration, the promotional slant of the county airports--and the fact that they involved capital construction--was well-suited to draw political support. And draw it did. Rhodes' inclusion of the airport program in a capital-improvement bond issue for roads and recreational facilities was the critical political choice, it energized the airport program.

It seems likely that the governor had been led to see the need for airport development because Crabtree drew it to his attention on flights to, and over, rural Ohio. And the role of DOA pilots as effective chauffeurs of the leaders of the state legislature probably enhanced the pointedness of Crabtree's wager that he could, whatever the FAA said, pull off his county airport stunt. There was synergy at work too. The establishment of the DECD in 1963 as the business-development arm of state government gave the county airports a natural ally among the top level of State agencies. In retrospect, Crabtree and his colleagues remember DECD as their most significant governmental partner. Although DOA was formally part of the Department of Commerce, its offices were physically located at University Airport, a 20-minute drive from downtown Columbus. In periods of heavy recruiting activity--the norm during most of the airport program's early days--DOA pilots might well see and talk with DECD recruiters more than they would Commerce colleagues.

Interestingly, the DECD staffers who worked with Crabtree do not recall having played a pivotal role in airport program decisions. The importance of association with and information about DECD activities, however, may lie more with "spillover" than with direct effects. DOA

personnel could relay information to local community leaders, on an informal basis, about companies interested in building plants in Ohio, and that could sometimes lead to a new plant which might use a county airport. There was probably an ideological spillover too: Because of their informal ties to DECD, DOA personnel may have been encouraged to think of themselves as agents of economic development; certainly they could talk more knowledgeably about development problems as a result of this shoulder-rubbing.

That DOA had the administrative freedom, and Norm Crabtree the inclination, to launch the county airport program was no guarantee, of course, that the organization would, in the event, be able to fulfill the promises made in the county airport development plan. As we shall see, the most important element of their ability to do so was a remarkable flair for technological innovation in airport construction. But this flair could never have been displayed, were it not for the fact that DOA was a remarkably small organization--and that it stayed small throughout the period of airport construction.

Through the construction phase of the county airport program, DOA had about 15 full-time employees, who, according to an estimate by John Cornett, spent about one-fourth of their time with the airports. Cornett and Crabtree each put in about 40% of their time during that period, handling relations with the local communities, construction difficulties, and the like. The only DOA staff member who really worked at all close to full involvement was the staff engineer, a civil engineer borrowed from the Department of Highways; he spent 75% of his time on airports, according to Cornett. In addition to DOA employees, several others from DECD and other agencies were intermittently called upon to help. At maximum, the state government involvement in the airport program drew upon the full-time equivalent of fewer than five persons a year, for four years. Although the fiscal impact, at \$5 million, was not unduly burdensome, the fact that 50 airports were built at this level of effort is astounding.

Obviously, these personnel facts and figures do not tell the whole story. Forty per cent of Cornett's or Crabtree's time is about 35 hours

a week, not correcting for effectiveness of performance on the job. Both men work 12-hour days during the week, and, in summer, most weeks put in full weekends hosting and coordinating fly-ins. Remarkably, they seemed to do so with great gusto and satisfaction. Clearly, civil service pay scales do not provide sufficient incentive to elicit this sort of devotion. Although he is gaining increasing recognition, it is far from clear that Crabtree will ever benefit very much financially from his services to the dispersed community of general aviation. And his attitude toward FAA suggests that he has little future with that federal agency, at any rate.

These rationalist explanations, moreover, pale to mere insignificance against the realities of affect in DOA. The camaraderie displayed by the DOA staff is unusually intense. Crabtree speaks of DOA as a family; certainly the modes of interpersonal conflict and resolution within DOA are based far more on personal moral relations, and less on organizational authority and function, than in most organizational units, even ones of comparable size.¹⁸ The achievement of *Crabtree paterfamilias* has been to retain the loose-jointed informality of small-group relations, while also managing to carry out the tasks assigned the group. In an odd way, that is a description of what an educational counselor seeks to accomplish with his students; professionalization is fate, one might think.

Without detouring through the relevant socio-psychological inferences, it is worth noting two features of the DOA's organizational life: First, the independence of DOA as an administrative unit has made it possible to adjust the work around the small set of regulatory and piloting responsibilities which are the basic work of the Division. These tasks tend to be routine and stable, from an administrative point of view. Therefore, the responsibility for carrying them out can be clearly delegated to staff members who have an unambiguous sense of when they have succeeded in carrying out the assignment. That most of these tasks involve the pleasurable activity of flying prevents their (administratively) routine character from being personally uninteresting. The exercise of authority which would be needed in handling most routine

tasks, accordingly, is needed much less, and used much less, by Crabtree. Second, and of equal importance, the high level of personal integration shown by DOA staff tends to perpetuate itself.¹⁹ This is so in part because the group shares a great many opinions, not only about aviation, but about life in general. But the sense of mutual respect which Crabtree himself displays and encourages is likely to be of equal importance.

By early 1966, Norm Crabtree's faith that rural airports in Ohio could make a marked difference in the economic and social futures of the state was going to be tested. Before it could be, however, Crabtree and the DOA staff would have to convince others, in towns all over the state, that their faith was worth sharing. The implementation phase was beginning.

NOTES

¹ Indeed, as Professor Eugene C. Lee has pointed out to us, the use of state funds to benefit rural constituents might have been far harder to bring off after the redistribution of power imposed by the Supreme Court's "one-man-one-vote" ruling, a ruling which markedly increased urban representation in state legislatures.

² Compare Richard Hofstadter, *The Age of Reform* (New York: Vintage, 1955), p. 312: "By 1933 the American public had lived with the great corporation for so long that it was felt to be domesticated, and there was far more concern with getting business life on such a footing as would enable it to provide jobs than there was with breaking up the larger units." For all the small-business and agrarian aura of Rhodes' political image, the DECD of his administration concentrated primarily upon wooing large, often conglomerate industrial firms into the state.

³ As noted above, during the Rhodes administration Ohio's Department of Commerce, which is charged with regulating business practices, fell into decline. It is conventional wisdom in Ohio politics that John Gilligan, the Democrat who succeeded Rhodes, was considerably aided in his campaign by the discovery, during the gubernatorial race, of widespread corruption in Rhodes' Commerce Department.

The deemphasizing of regulatory activity may have had administrative, as well as ideological, repercussions, since DOA is nominally part of the Department of Commerce. As one of the branches of the department with a spotless record, DOA has been given considerable latitude during

the Gilligan administration, and it is only now, with DOA's impending incorporation into a new Department of Transportation, that DOA will actually become part of the day-to-day operations of state policy again.

⁴ Although several of the county airports were sited specifically to encourage recreational flying, their *economic* impact, especially when considered at the state level, is probably small.

⁵ For a comparison of the different states' tax policies, see Ira Sharkansky, *The Maligned States* (New York: McGraw-Hill, 1972) pp. 66-67.

⁶ Highway construction has almost surely had its largest economic impact in southeastern Ohio, where lack of transportation--among other problems--has for decades left the Appalachian mountain areas relatively disadvantaged in comparison with the rest of the state. Interestingly for our present purposes, a market analysis for commercial aviation in Appalachia recently demonstrated that third-tier aviation--that level of carrier which is technologically closest to general aviation--is no longer economically viable in the area. The reason is that the completion of interstate highways has cut down travel time sufficiently that the high cost of air travel is no longer competitive for enough potential passengers. See Aerospace Corporation, Task D of its study of *Short Take-Off and Landing Aircraft Systems*, Ames Research Center, National Aeronautics and Space Administration, 1972.

⁷ That said, however, one should also point out the difficulties which plague attempts to assign causality in analyzing social changes. As impartial observers of the DOA program have noted, the airport program was carried out over several years, during a time of concurrent change and industrial relocation. The shift toward suburban and rural plant sites which seems to have occurred in the late 1960's was certainly due to a complex combination of many factors--among which the building of a general aviation airport near a prospective plant site *could be* a consideration. Exploration of the likelihood that airports contributed significantly to decisions about plant location or the movement of corporate operations into Ohio from other states is one of the objectives of the community study reported in Part III. There we ask, in effect, to what degree can evidence be gathered that informs us about the economic contributions of airport development in smaller rural communities?

The conceptual difficulties raised by the issue of causation is one to which we return below, at greater length. For the present, suffice it to say that no *naïve* concept of causality seems satisfactory.

⁸ Compare the discussion in Chapter Five of the conditions under which public programs are perceived to have redistributive consequences.

⁹ On the holiness of round numbers in budgets, see Aaron Wildavsky, *The Politics of the Budgetary Process* (Boston: Little, Brown, 1964)

Chapter 2. For interesting theoretical insights into the "tacit bargaining" process by which such program details are arrived at, see Thomas C. Schelling, *The Strategy of Conflict* (New York: Oxford University Press, 1964) Chapter 3.

¹⁰ This discussion was stimulated by Stuart A. Ross.

¹¹ Note that we continue to use the county as the appropriate planning unit. Because Ohio's counties are geographically small (at least in comparison with county divisions in the West), location choices within a county probably make little difference from the standpoint of economic development of the areas as a whole.

¹² "In 1952, [Federal Aviation Agency] and National Association of State Aviation officials entered into an agreement that established procedures for dealing with violations of aviation law....The Federal agencies would have responsibility for dealing with all contraventions by air carriers, while the state would, generally, handle...general aviation," Robert Hoffman, "Your State Aviation Director--What Has He Done for You Lately?" *Flying* (May, 1971) p. S2. Hoffman notes that the agreement on law enforcement has not been uniformly observed, and he argues that state aviation agencies still have quite widely varying domains of responsibility.

¹³ It is interesting to note that the assignment of this chauffeuring task to DOA was done for *technical* rather than functional-organizational reasons. Moreover, from the point of view directed at understanding the county airport story, the *informal*, unofficial linkages which flying the governor fostered were far more important to the ability of DOA to carry out its innovative programs than the official duties which it was assigned.

¹⁴ And, given the extreme fragmentation of general-aviation-related business and the poor profit showings of most fixed-base operators at the county airports, there seems no reason to think that excessive *profits*, the normal target of economic regulation, posed any serious threat to the public interest.

¹⁵ See, e.g., Jeremy J. Warford, *Public Policy Toward General Aviation* (Washington: Brookings Institution, 1971) Chapter 2.

¹⁶ Indeed, it has only been under the pressure of possible government regulation of all general aviation uses of major commercial airports that general aviation has become a political lobbying force of much consequence. The specter of federal regulation, arising in response to congestion at commercial airports, is discussed in Michael E. Levine, "Landing Fees and the Airport Congestion Problem," *Journal of*

Law and Economics, XII (April 1969), pp. 79-108. The important point for the present analysis is that the definition of the "interest group" awaited the formulation of the policy issue of regulation at the governmental level. In the absence of that formulation, there were only divergent groups sharing airspace and aeronautical practices.

This pattern of mobilization in response to governmental policy may be characteristic of policies involving regulation. See Theodore J. Lowi, "American Business, Public Policy, Case Studies, and Political Theory," *World Politics* 16 (1964) pp. 677-715.

¹⁷Hoffman, *op. cit*, p. S5: "One of the bewildering aspects of this state-aviation business is the basic philosophical and political differences with respect to the financing of airport development."

¹⁸Cf. Weber's discussion of charismatic authority and bureaucracy, in *From Max Weber*, ed. and trans. H. H. Gerth and C. Wright Mills (New York: Oxford University Press, 1946) pp. 196-264.

¹⁹Crabtree noted that DOA's first woman pilot, who was hired recently, had had some rough moments defining her privileges and responsibilities among the brotherhood of staff pilots, but that she had done so, quite rapidly, with no explicit direction from her colleagues. This seems to have been accomplished with great skill and respect by Crabtree and his colleagues, and it depended upon everyone's acceptance of technical competence as the criterion of status. Once the new pilot, whose skills needed more development, acceded to the realities of her technical ranking, her sense of respect for her colleagues--and their respect for her--was satisfactorily in line with the group norms.

CHAPTER FOUR

CRABTREE AND THE GRASS ROOTS--IMPLEMENTATION*

"Four Hundred Speeches in the First Year." The \$5 million bond issue was but the beginning so far as the Division of Aviation (DOA) was concerned. Governor Rhodes, legislators, and other high state officials were all more or less sympathetic to the idea that airports--like the tracks and roads of earlier transport technologies--could bring economic development to the hinterlands. Those in the hinterlands were not so sure, especially when it became apparent that they would have to put up some of the financial backing. Throughout the initial construction period, while the \$5 million was being allocated, DOA personnel spent much of their time out stumping for the idea of a local airport before rural gatherings marked variously by reluctance and enthusiasm. After the institutional politicking in Columbus--to get the money--came an extended period of grass roots politicking all over the state--to spend it sensibly.

In broad outline, the missionary work of Crabtree and his colleagues is an example of the "diffusion of innovations" studied by sociologists of technological change.¹ The DOA staff, from this perspective, played a key role in persuading the people of rural Ohio that airport development was a good thing. In modern jargon, the DOA sought "public acceptance" of the airport concept. Yet this was political work too--and it is important to see that the DOA staff ranged far beyond mere acceptability in their discussions with local townspeople. For while the people were learning about the benefits of general aviation, DOA was learning about the ways in which airport construction and operation could become part of community life.² The success of the airport program would depend critically on how well the fit could be tailored.

* Contributed by Kai N. Lee

SPREADING THE FAITH

It was not clear how people in rural communities should, or even could, become involved in a new airport. The immediate challenge for DOA, once the money was in hand and the FAA faced down, was to translate the concept of a "general aviation airport" into terms which would encourage both understanding and enthusiasm. Without an adequate understanding of the technical, economic, and developmental implications of the airport, local townspeople would not be able to use the facility effectively, particularly for the wider social development ends which Crabtree had in mind. Without enthusiasm for these ends, there would be no motive to shoulder the responsibilities attending airport operation. The commitment of DOA staff to provide the local communities with the information and the frame of mind needed to embrace the airport concept shaped the way they spread the faith.

To be sure, an adequate understanding was not necessarily a complete one. Contemporary concern for the deleterious side-effects of growth was notably absent. And the desire to fire up enthusiasm surely made exaggeration irresistible. In retrospect, the most serious distortion was an omission: There was a persistent tendency--when the issue came up at all--to down-play the historic difficulties faced by fixed-base operations. These independent small businesses, providing a mix of services to pilots, the aircraft, and those who want to fly, have traditionally been economically marginal. As it turns out, many counties have indeed had trouble maintaining fixed-based operators at their airports. While in a sense these business troubles are part of normal economic risk, DOA might have shared its experience more openly with townspeople unfamiliar with general aviation.

In the first year of the county airport program, DOA staff gave over 400 speeches about it, all over rural Ohio. Like office seekers on the hustings--which in a way they were, after their pledge to the legislature--Crabtree, Cornett, and a small band of true believers spoke to any group that would listen. Not only chambers of commerce, Elks Clubs, and farm cooperatives, but church groups, garden clubs, and

other less-than-likely assemblies all heard the men from Columbus. The similarities to a political campaign ran more than skin deep. When there were requests from Jackson County, Crabtree, who grew up there, would try to go. In general DOA staffers were assigned to their native counties. The fact that several of them grew up in rural Ohio may have reinforced the strong emphasis on acquiring an intimate, gut-level feel for the political texture of the local communities. "Get to know the people," Cornett said. "That's the way to understand their needs."

In this whirlwind of activity, only one group of citizens was not actively solicited: pilots. Although invitations from flying clubs were not turned down, and sometimes a local flier would take the lead in inviting a DOA speaker to the Rotary luncheon, a consistent attempt was made to emphasize that the airport would be far more than a playpen for the Sunday flier.

In the course of 400 speeches, the presentations became expectably routinized, as DOA staff developed and refined a detailed understanding of the response of a general audience to the idea of a county airport. Cornett remembers that the speeches placed principal stress on the broad promise of economic development. By putting the airport into this wider setting, the more technical and more immediate questions about the feasibility of the project could be answered in terms of the social benefits which it would bring the community as a whole.

The opening theme of the talk was social cohesion. Rural parents needed little reminding that economic stagnation and technological displacement had drawn their children to the cities. Young people, after growing up in small communities, often could not find work nearby. DOA staff argued the theme of development, but with a difference. Economic development, they argued, meant much more than simple monetary gain. It would make home a place to come back to, permanently.

Airport development, the talk continued, was an important stimulus to overall development. Moreover, the state-sponsored program was only one element in a whole range of development assistance services. DECD's recruitment program, vocational education to help attract plants, and development of new highways and other modes of transportation--all

would be part of the cycle of development starting with airport construction. Interestingly, the approach through the broad setting of economic development also tended to highlight the rather minor role which general aviation could play as a transportation mode. As subsequent patterns of use would confirm, general aviation is useful primarily as a *communications* medium for corporate elites, or else as transportation for extremely high-cost or high-value items such as pharmaceuticals or machine parts for emergency factory repairs. (See Chapter Seven.) Most routine travel, and almost all freight shipments, continue to go by truck or rail. The barrage of allied state development capabilities by bringing economic development to the fore also--as our own field investigations indeed verified in a number of instances--shifted attention *away* from the unique (and limited) implications of the airport and its contributions to community welfare.³

In these discussions of economic development Crabtree remembers DECD as an important adjunct to his own proselytizing. Yet DECD staffer Fred Herr, who served as the main link between DECD and the airport program, recalls being asked to speak at community meetings principally because of his experience as a pilot. As noted above, the connection of the airports to economic development may have been as much symbolic as functional--even to DOA staff. Indeed, the juxtaposition of airports and business expansion seems to have been motivated more by entrepreneurial zeal than descriptive accuracy, it had the effect of releasing latent associations between transportation and economic change in the minds of local people. Instead of presenting a narrowly argued comparison of costs and benefits, the Crabtree strategy was to talk expansively, to highlight possibilities, to widen the perception of general aviation and its potential connections to socially meaningful parts of everyday life.

Perhaps more significant in the end, the broad coverage of DOA staff encouraged the emergence of the "natural" leaders of the community.⁴ This Jeffersonian approach had its pragmatic side, of course; if the stakes in the airport were vested in those who cared about its success--and who were themselves likely to be successful--then so much

the better. But this strategy was equally a political motive. By widening the base of participation, the chances that the airport would become the creature of the local circle of pilots would be minimized. When the degree of community participation needed to complete construction became evident, this broad base of support became indispensable, it is not all that public spirited to contribute to an airfield for Sunday fliers.

"Three Thousand Feet of County Road"

After the DOA representative gave his introductory spiel, there would be a question and answer period. The first question, DOA staffers remember, invariably expressed doubt that an airport was a feasible undertaking for a rural community. Citizens thought instinctively of Chicago's O'Hare Field or Los Angeles International. For them, DOA originated the airport program's most powerful image: A county airport, Crabtree notes with relish even now, is not much more than 3,000 feet of county road--or 4,200 feet, under the second phase of development.

The image is a disarming one. Each county, Crabtree notes, already has several hundred miles of county road, and it has the taxing structure, organization, and know-how to maintain it. So why not add half or three-quarters of a mile more?

Moreover, the parallel between aircraft and automobile technology can be endlessly elaborated. The DOA required that counties agree not to charge landing fees at their airports for at least the first 20 years of operation.⁵ This is similar to the trend away from charging tolls for road use, a trend which has been the hallmark of an automotive civilization. But parking may not be free, and the fixed-base operators who offer tie-downs, fuel, and other services, are entitled to charge market prices, much like auto service station operators.

Perhaps even more important, the auto parallel permitted community leaders to think about the airport's supporting institutions--and to begin to think about whether they were all that intimidating, after all. For example, special users might be induced to pay special tax assessments, if an industrial plant wanted to locate next to the runway. and

give the airport extensive use, that might be done with an extra property tax--a road tax, to follow the image.

Additionally, the county road image may have inspired a whole series of "porkbarrel" political forms, which DOA employed to full effect. The most obvious instance is the idea of the community stake in the financing of the airport. This directly parallels federal highway assistance programs, which provide a large--but almost never total--contribution to the costs of road construction. And when money was not the sticking point, more pork could be added to the barrel. In one case, municipal opposition was quieted when local airport boosters, under DOA prodding, agreed to build a municipal park at the end of the runway. One surmises that flights were thought to be sufficiently infrequent to keep gambling an audible sport.

Indeed, the airport itself was often regarded as a recreational facility--a point noted often in later promotion efforts by DOA staff. Many communities provided picnic tables by the runway, so that families could watch take-offs and landings over a weekend lunch.⁶ In several places, the airport was sited on county land--for example, next to the county home for the aged. Cornett describes with pride the sight of a row of rocking chairs, all occupied by elderly spectators, lining the runway on sunny days.

But it was particularly from the engineering standpoint that the analogy between auto and airplane seemed to bear fruit. By thinking of the runway as a county road, Crabtree came naturally to think about how to adapt airport technology to the existing stock of road-related equipment. Surprisingly, such adaptation seems not to have been made extensively before, perhaps because of the dominance of state management in road building, and the prevalence of federal controls for airport construction. The most important innovation was the extensive use of ordinary road-building techniques to lay down runways. Far cheaper than the custom designs normally used for airport building, these methods turned out to be the crucial element of lowering costs close to the \$100,000 target.⁷

In some ways more spectacular than the cost breakthrough on runways construction was the flurry of new airport equipment which the airport program inspired. More details will be found below, but here it is worth noting that Crabtree capitalized on highways again, in runway light designs. Eschewing FAA-standard lights, he fostered the development of lights using traffic-signal bulbs--at a fifth the cost of the FAA design. As in the runway building instance the crucial change in perspective was to see that one would have to go about equipping "3,000 feet of county road" at a fraction of the cost of equipping an equal length of runway. And it turned out to be possible to do.⁸

Perhaps most surprising of all, given the power of the county road image, was the fact that it never displaced the underlying status and prestige connotations of having an airport near town. For the local residents, the county road was a private, elite image: *they* would know that it was not so hard to build, but others would see a sleek, glamorous airport.

Buying In

Once the first several counties agreed to build airports, the snowball was rolling. DOA found it possible to create a set of situations in which they were managing a potential scarcity of airports, instead of having to peddle an unwelcome state intrusion. The 400 speeches had won enough airport enthusiasts in the rural communities to turn the airport program into a competitive, market-like setting, in which DOA could play the role of broker. It was the role Crabtree wanted and would hold on to.

The scarcity of airports, such as it was, came from the fact that the initial funding provided only 50 airports for 62 eligible counties. Yet although several counties in the end did not receive airport funds even though they wanted them, it is misleading to think of the competitive phase of the airport program simply in terms of an economic market. More than the satisfaction of demands, what was involved here was the *creation* of them, largely under the skillful promotional efforts of

Crabtree and the DOA staff. Despite this very important difference, several economic notions, describing imperfections in competition, are illuminating.⁹ Apart from competition itself, the ideas of product differentiation and barrier to entry are useful.

As the phenomenon of keeping-up-with-the-Joneses illustrates, the most important thing about a competitive setting, sometimes, is that it is competitive. This is more often the case, expectably, for goods that are both conspicuous and symbolic. Once a county agreed to build an airport, the people of neighboring counties were kept apprised of the imminent decline in their fashionableness by DOA visitors. The two stubborn counties which ended by building separate airports five miles apart seem to have carried consumption to its conspicuous limit.

Prestige attached to having an airport in one's own county was not a simple promotional gimmick. Economists have long noted the phenomenon of brand-name loyalty, a major factor in consumer behavior enabling "product differentiation," the process by which functionally or technologically like goods--such as soap--become in the market place entirely different commodities. Once the change in consumer perspective occurs, the economist tells us, people are willing to pay different prices for the "differentiated" goods. The transition from *an* airport to *our* airport may be seen as an instance of such product differentiation. In county after county fund raising campaigns successfully elicited supplemental contributions, in several cases matching the State's \$100,000 grant. In every county, some arrangement, most often outright donation, was made to acquire land for the airport. Willingness to pay for *our* airport merged with community pride and loyalty.

Crabtree, by calling an "informational" meeting of county engineers, shrewdly extended this hometown, competitive spirit to the professional level: The DOA staff brought home the road technology analogy by fixing upon the technical specifications for airport construction, making of it a public works engineering problem, as it were. When several county engineers voiced hesitancy about the technical tasks, one of their feistier colleagues, whose own county had begun construction of an airport, offered to show them "how *we* do it." The county airport

program may have gained an adherent or two that day. But more lastingly important was the way in which the idea of a county airport took on the dimensions of a professional challenge to a key group of potential local opponents.

Early reluctance to become involved with the airport provides us with an example of what an economist calls a barrier to entry. Even if the airport provided a clear-cut advantage for a county--as it seemed to do in the competitive phase--rural citizens hung back out of fear that the project might not be feasible. The pattern is a familiar one to students of innovations.¹⁰ Once it became clear that \$100,000 would pay for a sizable part of the construction, the doubters lost a powerful argument. The successful attempts at recruiting industrial plants to locate in towns where airports were being built lowered yet another barrier to entry. And the successes in the DOA track record became part of the recruitment talk.

These economic ideas help us to understand the motivating forces at work in DOA's appeals to the civic interests of community leaders in rural counties. It is valuable to see, then, that a wholly different perspective can be suggestive as well: We might wonder what those 400 speeches enabled the men of DOA to learn about the communities which they hoped would apply for airport grants.

Although Cornett now remembers the common features of various groups' response to the DOA promotion speeches, there were differences. Eventually, some airports were built to encourage recreational flying in towns which could as well have tried to spur industrial development. Crabtree remembers them as towns in which the business community was concerned about upsetting the local labor market by a sudden influx of industry, especially industries which employed union labor in otherwise nonunion communities. More generally, the prospect of having an airport, and the types of social and economic changes which the DOA proponents claimed it would bring, provided a setting for public discussion and decision from which one could learn a lot. Even now Crabtree has an extraordinarily intimate familiarity with each of the communities in which an airport was built--a familiarity which seems to be legendary throughout Ohio government.

Just as a discussion of the imperfections of competition among counties illuminates the uncertainties about the airport which local citizens felt, the notion of the airport as an empty slate eliciting spontaneous response gives us a way of highlighting the uncertainties about the community in the minds of DOA officials. Despite their heavy reliance on concrete benefits to the community, Crabtree and his associates could not be sure what kinds of changes the airport would in fact bring. Therefore, determining what was in the "public interest" was, at best, a matter of subjective judgment. The best one could do was to match governmental action to the community's expectations, and to aim at leavening those expectations with enough modesty to prevent disillusionment. However well Crabtree handled the latter, he appears to have done the former with unusual accuracy.

The lesson here may be quite general. Projects like a county airport, an industrial park, or a housing development have long-term consequences which are intrinsically unpredictable. Certainly as a practical matter there are many decisions which are too isolated or too idiosyncratic to be amenable to statistical analysis. Some of these choices make a difference in the long term. Under these conditions, it is silly to attempt once-and-for-all solutions. It is more important instead to provide the social conditions for future flexibility. Yet not all kinds of flexibility may be concurrently available. Thus one needs to feel out the kinds of flexibility which are highly valued in the community. Although the methodology for doing this kind of assessment is not codified, it seems that Crabtree's attempt to elicit spontaneous response to the idea of the airport gave him important information on how to tailor each particular airport to its community setting.¹¹ It is certain that it was not the kind of data that a market-research opinion poll on whether people in town "favored" an airport would have revealed. For even those with "no opinion" might reveal vital but unspoken stakes in a rambling discussion about airports, economic development, and community life.

But the staff of DOA did not tarry to reflect upon how they tried to ascertain the public interest. There were airports to be built.

CONCRETE RESULTS

Even if a runway is no more than 3,000 feet of county road, of course, an *airport* is a bit more elaborate. So it was that DOA found itself drawn into a web of activities ranging far beyond the construction task. After laying out the basic pattern of aid to counties in the building phase, we shall look more closely at three ways in which DOA helped the communities to adjust their relationships with the world outside. First, with other parts of the state government, primarily for matters related to airport development; second, with businesses interested in locating in towns with new airports; and third, with the small businessmen who might find in the airports themselves an economic opportunity, the fixed-base operators.

The Pattern of Construction

Once the idea of a county airport as a community project took hold, DOA tried to play a neutral, technical role. In part this was a way to put the ideological commitment to local autonomy into the texture of the program. More immediately, the demands of trying to cope with 50 airports over five years limited DOA's involvement in any one county. DOA participation came principally during the initial grant application, when the site and design of the airport was chosen, and during three subsequent "brokerage" opportunities--while assembling community resources to supplement state funds, while recruiting new businesses to locate near airports, and at the fly-in dedication of the completed airport.

After community members expressed interest in having a county airport, the first order of business was to develop a design which could be approved to obtain the state's \$100,000 grant. The design depended, in turn, on which site was chosen--a decision which in urban areas has drawn much political fire. But DOA, as initiators of a new program, successfully managed to define their role in technical terms, largely avoiding advocacy of sites in a county on economic or political grounds. DOA left initial site selection up to the county government, which could

either assemble a set of candidate sites itself, or else appoint an independent airport commission to oversee the project. In either case, DOA could avoid the political liability of identifying which areas of each county would be altered by the airport, whose land values would rise, whose would fall, and the like. One measure of DOA's insistence on localizing these politically charged decisions may be found in state legislation specifying the responsibilities--and thus the legitimacy--of the independent airport commissions; the law was passed at DOA behest. Once the initial set of sites was selected, Crabtree and the engineers would select the one best suited to aeronautical uses, basing their decision upon orientation with respect to prevailing winds, physical obstructions in the flight path, and other technical considerations.

Only one nontechnical consideration played a role in site selection, though often it was a determinative one. If there was land which could be acquired free, either by altering the existing use of public land, or by inducing someone to donate private land, some of the technical considerations could be, and were, skirted. When the land came from private hands, the contribution was virtually certain to be the largest single donation from the community; in Holmes County (one of those included in the community portion of this study) Crabtree appraised the property given for the airport at \$20,000. Sometimes the donor would realize spinoff benefits, beyond a tax writeoff. In one instance, a private airstrip operator, who had been struggling along with a marginal operation, donated his airstrip property to the county, in return for being named the fixed-base operator of the improved airport. In addition to the concession rights, Cornett notes, the man no longer had to pay property taxes on the land.

As the county road image suggests, the technical specifications for the runway could be handled in a more or less routine way. A civil engineer, administratively "borrowed" from the Department of Highways, has been working at DOA since the beginning of the county airport program. He has worked with county engineers to match existing roadway designs to the special soil, drainage, and load-bearing characteristics of each airport site. When future industrial use was contemplated, for

example, extra taxiway access was often laid out, so that aircraft could come right up to plant loading docks. The degree of tailoring of a standard design which was needed varied, but it was hardly ever of major proportions. Sometimes, in fact, designs were adopted in rough form, so much so that unexpected problems cropped up in the actual construction. All of these, however, were enough like familiar highway building difficulties that they could be solved satisfactorily on the spot. The FAA, needless to say, would never be caught dead using such a casual approach. Yet it is thoroughly in the spirit of Crabtree's decentralizing thrust to let problems arise, to be taken care of at the level most familiar with local conditions.

So far as the airport facilities themselves were concerned, one further barrier remained: in virtually every case the state's \$100,000 grant was not enough to complete construction. But by raising money and obtaining contributions in kind of labor and materials, the difference was made up. Much of the money raising was of a sort familiar to these communities which had sent their high school bands and church choirs on European tours. In a number of instances, however, DOA kibitzers brought in new ideas from other counties. The airport commission was headed in one county by the president of a printing company, and he had the idea of selling a special airport booster's edition of the local newspaper, priced at five dollars, to raise funds. DOA spread the idea and at least one other county tried it out, successfully.

In soliciting in-kind contributions, DOA was more frequently helpful, particularly in obtaining bootlegged government aid. A National Guard engineer's brigade on annual refresher maneuvers was persuaded to hold their exercises on the site of a new airport, where they "just happened" to do a vital part of the grading for the runway. While most of the opportunities were first sniffed out by local airport proponents, often a phone call urging support from Crabtree or Governor Rhodes helped to seal the deal. The field studies reported in Part III provide several examples of the ways in which supplemental contributions were solicited.

The viability of the airport as a community development project lay in its ability to attract industrial or recreational investment.

Since this was a central part of DOA's understanding of its mission, we shall discuss the activities involved further below. It is worth noting here, however, that much of Crabtree's sense of the Program's success derives from development near the airports. While Cornett showed us aerial slides of the airports one afternoon, his most frequent comment about the older photographs was, "There's a lot more plants there now." Not said boastfully, but as a matter of fact: that is what became of what we did, he seemed to say.

The official conception of the county airport was restricted to a runway and some parking space for aircraft. In nearly every county, however, the local airport proponents managed to find the money to build some sort of airport terminal building, though sometimes this was added after the original construction had been completed. Later development has festooned a number of the more prosperous airports with lines of hangars, industrial buildings, and tie-down spaces.

When the county airport was finished, the airport developers, with DOA assistance, held official dedication ceremonies. Scheduled mostly on spring and summer weekends, the ceremonies were usually built around the general aviator's version of a revival meeting, the fly-in. Weeks ahead, DOA would line up aerobatic teams--mostly amateur daredevils--and send out notices of the impending celebration to the licensed pilots of Ohio. Area notables, including state legislators and Congressmen, would be invited, and Governor Rhodes would be lined up for a dedication speech. Then, on the day of the dedication DOA staff would fly down in an old DC-3. They would take children up for rides, "to see your house from the air." Norm Crabtree would be master of ceremonies, and John Cornett traffic supervisor, for an extended, if sedate, aeronautic saturnalia.

The aim of the fly-in and dedication was to put a symbolic capstone on the project. Like many other public ceremonies, the symbolic import was by no means insignificant or frivolous.¹² Crabtree notes a bit wryly that one or more Congressmen would usually attend, despite the fact that the airport was paid for entirely by state and local funds. He would always introduce them with a flourish, however, for the celebration was a rite of legitimation. Additionally, it was a way for the community to express its support for the airport and appreciation for those who

had contributed to its successful completion. In the years to follow, the economic and social patterns following in the wake of the airport would have intricate and uncertain effects upon the lives of those living in the area. But at the dedication one could put aside the uncertainties and be glad the job of building was done. In Holmes County, for example, which has a sizable Amish community, a group known for its cautious approach to modernity, some Amish elders took Governor Rhodes for a buggy jaunt at the dedication fly-in--down the runway, of course.

Patterns of Government Assistance

The aid which DOA officials supplied to the counties did not come solely from DOA resources. Within the state government several agencies helped out, both in relationships with the counties which DOA helped to establish, and in governmental coordination in the airport program itself. In addition, Crabtree sparked a substantial measure of technological innovation in equipment to be used at county airports. These innovations were an important adjunct to the cost breakthrough in construction which allowed the airports to be built for sums roughly within the outlines of the state grants.

In all this governmental activity, however, the DOA role was that of broker and coordinator, not planner or programmer. Each airport project was handled more or less as an individual case. To some extent, as we have described above, the runway design and the dedication ceremony arrangements could be made routine--and they were. But the initial persuasion of the community (which often involved 10 to 20 speeches), the arrangements for supplemental resources, and the recruitment of business were all done bit by bit.¹³ Such a procedure appears inefficient when compared to the implementing of a rational plan, which would proceed through a series of program stages. Yet the piecemeal approach did encourage the consideration of each county as a unique case, one to be fitted to a tailor-made set of arrangements. Both the actual responsiveness of the DOA's administration, and the intimate, personal approach which Crabtree and his colleagues adopted, seem to have been important

positive aspects of the program. Moreover, as observers of the DOA program have pointed out, a comprehensive program calling upon the participation of several other government agencies would not have been approved or carried out. Politically, the piecemeal effort kept a low profile, forestalling opposition to a massive plan.

Throughout the construction phase of the airport program, DOA operated under the guidance of a multi-agency coordinating council. With official representation from DECD, the Department of Finance, the Attorney General's office, and the Department of Public Works, the coordinating council was assembled for meetings when Crabtree felt that enough problems needing review had collected to make an agenda. During the construction period, these meetings were held as often as once a month. The coordinating council served the purpose of supplementing with other agency missions and other agencies' capabilities, DOA's day-to-day judgments and use of its resources. A recurrent theme, for example, was the need to match up new airport sites with industrial plants relocating in Ohio. The routing of state highways to provide readier access to airport sites was another consideration, although at this period not much new highway building was underway that could make a difference. And the legal intricacies of land donations, tax rearrangements, and other aspects of arranging for the airport were overseen by the attorney general's representative.

The questions which arose within the coordinating council, as these examples show, tended to be largely technical. That is, the perspective from which they were approached decidedly underplayed the political ramifications of the airport project. Thus, Crabtree's inquiries about new plants being located in the state did not connote any pressure from him or from DECD to locate the plants near airports. Instead, DOA would relay information that a given industrial corporation was considering new plant construction in Ohio and leave the rest up to local community interests. That the information thus flowed with extra volume to towns where airports were being built may well have influenced the subsequent pattern of industrial development, certainly DOA takes pride in that which did follow the construction of the airports. Yet the

policy of maintaining the state agency's neutrality as between location in one town or another in Ohio makes simple causal connections hard to define.

Another aspect of the coordinating council's activities is at first sight surprising--at least in comparison with the federal experience. As in DOA itself, there appears to have been an unusual degree of small-group familiarity among the members of the council in two respects. First, council deliberations evinced little or no administrative politicking, according to Cornett's recollections.¹⁴ As Cornett notes, the airport program may simply have been not important enough for agencies to have much at stake in it. Moreover, the technical cast of the questions addressed by the council tended to make each member's contributions both expert--in comparison to others on the council--yet not in competition with any colleague's expertise. Indeed, under these conditions it was more important to elicit council participation than to hold down conflict, and Crabtree recalls making special efforts to solicit the views of members of the council.

Not only were council members unusually cooperative with one another, each of them seems in retrospect to have been surprisingly able to represent the spectrum of interests of his branch of state government. State agencies, in short, are relatively compact administrative entities, in comparison to their federal counterparts. Here again, the technical and relatively narrow scope of the questions addressed by the council undoubtedly reduced the range of concerns each agency representative needed to bear in mind. Yet one has the impression that governmental affairs, in the Rhodes administration at least, tended to have a relatively unbureaucratized character, which in turn contributed to the successful operation of this administrative committee.

The insistence upon a neutral, technical role for DOA stands in marked contrast to political activities at both the county level and among general aviation interests across the nation. Although the appearance of neutrality is a predictable characteristic of most government operations, DOA's perception of its role had a functional as well as political logic behind it. At the county level, the fact that DOA

was in a position to make technical choices about matters such as the airport site made it possible for DOA to function as a new, but legitimate, channel of communication and community decisionmaking. The energy with which Crabtree helped to marshal community resources to supplement the state construction grant is perhaps the most evident example. Nonetheless, it might be noted that the neutrality was neutrality with regard to existing divisions in the community; DOA was more than willing to take up sides against opponents of the airports.¹⁵ If DOA functioned as a new communication channel, the channel was not put at the disposal of those who opposed the scheme of economic and social development which the airports were designed to urge along.¹⁶

DOA's neutral stance in the airport program provided a different kind of support for the general aviation community. As we noted in passing earlier, the increase of aeronautical traffic at major urban airports has led to proposals for new means of regulating general aviation. Private and business pilots have complained bitterly that these regulations would make flying prohibitively expensive.¹⁷ The Ohio Division of Aviation, which is reputed to be the one state aviation agency in the nation most favorable to general aviation, has more or less taken its side in this controversy, although not vociferously. The county airports, by providing a network of general aviation airports, tend to relieve some of the congestion at Ohio's urban hub airports. To that extent, the county airports are a technological solution to the problem. More than meeting the congestion problem, however, the proliferation of the county airports was a visible commitment to general aviation, in just the historical period when general aviators were being assembled into a political force. DOA accordingly acquired the support of the general aviation community, without needing to become a visible opponent of the schemes to eliminate congestion.¹⁸ That support, in turn, promises to be significant for both DOA and general aviation in the future, as general aviation continues to be buffeted about by a national transportation system growing ever more integrated, yet continuing in its dependence upon state-level agencies for the administration of public policy.

Technological Innovation: The Airport Lights

Perhaps the most striking aspect of DOA's role in the county airport system was the part played by Crabtree in dramatically lowering the costs of airport lighting and marker equipment. Although in economic terms the savings here were less than those achieved by the switch to highway construction methods discussed above, the kind of break-throughs accomplished in lighting equipment did make a substantial difference. Moreover, the innovations which were discovered and put to use demonstrate quite clearly the importance of even quite prosaic alterations in the details of a technology.

As with so much else in the county airport story, serendipity bulks large in the lighting case. For several years before the county airport program was begun, Crabtree had been acquainted with Jess Howard, the president of Alnaco, Inc., a Columbus-based manufacturing firm which built lighting systems for airports. Alnaco, of course, followed FAA specifications in its designs, since FAA-funded airport programs accounted for virtually all of the firm's business. Crabtree realized from the start that the lighting equipment would be very costly for the county airport projects. He asked Howard to look into ways of lowering costs, and down they came.

First, Howard examined the details of a runway marker light--the low, dim light by the side of the runway, strings of which outline taxiways and runways at night. The FAA design cost \$60 per light, with a typical runway requiring nearly a hundred. This high-priced design includes an intricate leveling device, so that the bulb and reflector may be realigned to the vertical after being bumped by an errant wheel. Most bumpings, however, bend the shaft of the light so badly that the basic frame must be discarded and replaced. So the leveling device was eliminated. Instead of costly, limited-production light bulbs, Howard substituted highway-department issue bulbs, normally used in traffic lights--and therefore found in every county road department's normal inventory. Finally, as a manufacturer of the FAA-standard lights, Howard could go to the glass-molding firm which made the glass housings

for FAA lights--at \$13 apiece. He persuaded them to add on an extra order, at the end of their next run, thus avoiding the setting up charges which normally interrupt changeovers from one molding task to another. The glass company charged him \$2 per housing. In all, the runway lights came out selling for about \$15 each--and Alnaco made a handsome profit.

Later, Howard would redesign an airport beacon to sell for several hundred dollars--in place of an FAA-approved beacon selling for several thousand. FAA specifications, again established with large metropolitan airports in mind, required beacons to function under extremes of temperature and other environmental stresses. The rotating joint, for example, was to be capable of rapid startup at -59°C; Howard's simplified model could not come up to full speed for two or three minutes when started in the cold. Moreover, FAA specified that the beacon had to have its own self-contained backup system. If the primary light or motor failed, there had to be a substitute apparatus, ready to take over automatically. Howard's had no backup. As Cornett noted, there is no FAA requirement for a beacon at all in general aviation airports. If the light failed, the county airports could simply return to "normal" conditions.

Logic does not readily sway bureaucracy, however. FAA engineers raised their official eyebrows when Howard's beacons first went on sale. But then, an official at NASA, acting on behalf of the White House, called to inquire about using one of the new beacons to mark the White House helipad. Howard promptly shipped one off to Washington, received word that it worked fine, and notified FAA that the President was satisfied with his new beacon. The specifications were amended before long, and Howard's design is now officially approved.

Alnaco's revised design of runway lights and beacons both built upon Howard's knowledge of the details of the standard, expensive design, and on the auto-technology analogy pressed by Crabtree. Then, by retreating from the ambitious--and sometimes technically arbitrary--standards established by FAA for nationwide equipment specifications, Alnaco could slash costs drastically. In no case, however, was the breakthrough

a matter of making a science-based application, what one needed was common sense and experience in the business. Such technological innovation is in the style of the 19th century, not the 20th.

As one would expect from the large cost reductions, Alnaco could still reap a handsome return on its adventure into simplicity. Each airport cost about \$15,000 to equip, so that Alnaco grossed a half million on the program as a whole. Not a large sale, in some ways--but it is not a large company. And Alnaco has been able to sell the equipment elsewhere too, to private airport operators.

Why had Alnaco not seized this opportunity before? The very size of the economic savings, at this scale of manufacture, shows that the ideas were simple, even obvious. What was not obvious, however, was the size of the market, and the ease with which it could be reached. It was here that the county airport program was crucial, for DOA could show the way to a ready market of 50 customers. And, given the informal ties which had led Howard to the market, there would be no competitors. Indeed, Crabtree clearly felt that Howard deserved some entrepreneurial return for his helpfulness--if not for his technical wizardry. And it may well be that an important barrier to earlier innovators in airport lighting was the absence of an effective patenting system to protect the interests of those who innovate by substituting simple, readily available parts for intricate, custom-made ones. For it is common to have even fairly elaborate innovative ideas copied by competitors--but with enough of a difference that they can elude patent suits.

Again, these rational, economic considerations seem tangential, though not irrelevant, to the story of the lighting innovations. Cornett, in describing what happened, lays special stress--as he did in the case of Governor Rhodes--on Crabtree's personal rapport with Jess Howard. Howard, by Cornett's account, is a vigorous entrepreneurial type, and, with his interest in aviation, the sort who would find in Crabtree a natural ally and comrade. Certainly the combination of economic good fortune and public-spiritedness is hard to find in public projects. Nor do competitive notions of economic theory alone explain such matters as how Howard set his prices (surely not to maximize his gains on these

50 contracts), and how Crabtree provided Howard a "monopoly" for the county airport market.

Recruiting Business

The personal style which accomplished the airport lighting innovations also defines the way in which DOA helped bring businesses into towns near the airports. This is not surprising, given that both of these achievements involved entrepreneurial opportunities in which DOA played a catalytic, or broker's, role. The more subtle problem, for those who would analyze this process of brokerage, is that it takes place at a level of personal interaction which resists generalization. Two stories will illustrate the process as well as any more abstract analysis of it, for now.

One day early in his first term, Governor Rhodes learned that Annheuser-Busch, the St. Louis Brewing company, was planning to open a new bottling plant in Michigan or Ohio. Not waiting for the next day's business hours, he called the president of Annheuser-Busch at 11 p.m. ("only" 10 p.m. in St. Louis, across the time zone) asking to see him the next morning at 9 a.m. It was past midnight, as John Cornett recalls it, when DOA was contacted. Its young pilot arrived at University Airport before dawn in time to pick up the Governor, DECD director Fred Neuenschwander, and a team of "Rhodes Raiders" for a 6 a.m. take-off to St. Louis. At 9 a.m., the Raiders were knocking at the door, bowling over secretaries, and impressing the company president that Ohio's business was business. Whether this Schlitzkreig was the pivotal move is characteristically unclear. But Annheuser-Busch *did* build a plant in Worthington, the suburb of Columbus where DOA headquarters are located, and they are currently expanding its capacity.

This aggressive promotional style is the forte of high officials like Rhodes and Neuenschwander who have the symbols of office to reinforce their blandishments. Yet Crabtree, an entrepreneur cut from the same mold, has adapted the approach to the opportunities. The origins of Jackson Square, a shopping center in Crabtree's home town, are illustrative.

Jackson Square is owned by Hadler Realty, a company based in Columbus. Mr. Hadler, who often flew the company plane on business, frequently came to University Airport, where the craft was housed. Over the years, he had come to know Crabtree casually, much as Jess Howard had. When the airport program was started, Crabtree approached Hadler one day, asking if he had ever considered starting a development in Jackson. By the time the conversation was concluded, Crabtree had flown Hadler down to Jackson for a quick aerial inspection, and Hadler had shown interest in putting in a shopping center there. This all came so fast that Crabtree had not yet broached the subject with the townspeople of Jackson.

When they heard of it, several town businessmen were aghast. Dwight Jones, the druggist and old school chum of Crabtree's, complained that a fancy new shopping center drugstore would ruin his business. Crabtree tried to reassure him by noting that Jones' drugstore would continue to offer personalized service which most regular customers would want, and be willing to pay for. Meanwhile, Crabtree said, the development of the shopping center, like that of the airport, would draw in enough business that Jones would actually turn a better profit afterwards, from the overall increase in business activity in Jackson. Jones was reluctant to accept this scenario of good fortune at first, though now, Crabtree says, Jones is a firm believer in the principle that "business makes business" and recently thanked Crabtree for lobbying so hard for development in Jackson.

Jackson Square itself, according to Crabtree, has altered the shopping patterns of much of the surrounding Appalachian foothill region. Instead of going to Columbus for a daylong shopping excursion, area residents now come to Jackson to shop. Though many shop at Jackson Square--now grown to ten flourishing stores--there is substantial spillover downtown. And Dwight Jones' drugstore is doing just fine.

There are a number of questions left unspoken by such a narrative. For the gospel of growth by entrepreneurial stimulation tends consistently to underplay the effects of growth left unattended. It is often unclear what *difference* an aggressive recruitment program makes. If

Crabtree had not induced Hadler Realty to build a shopping center in Jackson, might it not have happened anyway? If Dwight Jones is prosperous today, how much might he have made if Jackson had continued to grow--and there were no Jackson Square to provide competition? It is clear that these questions do not now have clear cut answers, whatever their ultimate resolution.

Indeed, we ask such questions without implying that answers ought to be in hand before action is taken. The questions are important, instead, because they help us to see more clearly the network of stories and possibilities which Crabtree, Rhodes, and other proponents of development invoke when they argue in favor of their development schemes. On the one hand, it is not credible to *promise* that a particular set of benefits--or often any benefits at all--will stem from a certain path of development. Yet on the other hand, there is no denying that development plans such as those embodied in the county airport program are, after all, opportunities, there for the seizing, if not by the faint-hearted. In between lie encouragement, promotion, exaggeration, and often deception. Where and how to draw the line? Given what we can know about the future, it may be wrong to judge the worth of a man's promotion promises by a pseudo-scientific standard of how accurate his predictions about the future are. No one can know.¹⁹ The real question is not prediction but projection. What values does a particular profile of development embody? Are they those which have been articulated and adopted by the populations affected? More concretely, what values does DOA's implementation of the county airports embody?

The question is a complex one, to be sure. But Crabtree did outline an answer for us. Like his fellow Ohioans James Rhodes, Fred Neuen-schwander, and many of the airport proponents in the communities, Crabtree regards rural life as a passing phenomenon. Its passing, however regrettable, is, from the standpoint of governmental policy, inevitable. It makes no sense for citizens in the hinterlands to be denied the fruits of economic gain--and its consequent social development--as a matter of policy. Rather, there is, if anything, a presumption that economic development is progress. The magnitude and rapidity with

which changes are coming to rural areas, in Crabtree's view, are mounting, and they are determined in substantial measure by the evolution of urban areas. Implicitly, there is a sense here that the basis of an urban form of settlement may be undergoing fundamental changes. Too pragmatic to dwell upon such large-scale matters, Crabtree points to the continuing trend toward industrial location farther and farther from the inner city. This is a palpable sign, he maintains, that rural life, as it has been known in the past, is slowly becoming obsolete.

The challenge to Crabtree as a state official is not the irresistible force of social change itself, but the difficulties occasioned by changes in communities. On one side, Crabtree, in common with most of his constituents in rural areas, would like to preserve much of the value structure which shapes rural life. Yet on the other side, Crabtree is impatient with the traditionalists who cling to their set ways. The tension between saving what is worthy, and overcoming what is fusty, is not readily resolved.²⁰

What is at stake, as a practical matter, is the absence of leadership to keep things moving, and leadership to discern which way the future lies for a given community. There are managerial problems to be taken care of. One town, Crabtree said, had needed a new water system for years, but the pattern of conflicts over the issue had gradually ossified, and no one could break up the jam and get the water. But more important than such managerial problems is political leadership. If the problems of the past and present could not be sensibly resolved--as often they were not--then what lies in store for the future? The central requirement, Crabtree argued, is for new blood, a new, energetic group with both a stake in the community and the effectiveness to get things done. Since this leadership had in the cities traditionally come from the business community, Crabtree felt that was the right place to begin looking.

It is only at this grander scale that the argument for county airports takes on its full political significance. The airports, and the factories they would bring, are important not only for jobs, but for the people whom they would bring out to the rural areas. They were to be "the new class"; those who would see things through, protecting the values which need preserving, making the rest sleek and modern.

It is both easy and hard to challenge this vision. Easy, because all the questions of causation which we have pointed to earlier remain unanswered, and uncomfortable, when juxtaposed with this vision. It is easy to chip at the vision, and it does chip in fact. But even as a mosaic it retains a kind of congruent picture. For one thing, such a view of the future is widely shared in rural areas. Certainly the most backward region, Appalachia, welcomes economic development, even given fairly grave social and environmental risks. More important, there is not an alternative picture, except for the romantic one of abandoning growth and development outright. Arguments for doing so are strong, and the case for "no growth" even in its own way inevitable. But the time for appreciating its inevitability is not at hand, at least in rural Ohio. Until then DOA's advocacy of economic development falls on prepared ears. It is small wonder that they listen.

Significantly, though, DECD under the Gilligan administration has begun to shift. Rather than the upbeat boosterism of the Rhodes era, one hears now of the danger of long-term economic decline; the social injustices of unequal distribution of resources; and the problems of pollution, technological unemployment, and other unintended side-effects of "progress."

To point to such problems is to point also to a vision of government which intervenes more, with pollution regulations and perhaps an income tax. Also, business as a principal element of the social fabric is recognized by this more interventionist view of government. But the emphasis stresses more the narrowly economic functions of business--jobs taxes, and economic product--and puts far less faith in business and businessmen as the mainstays of the society as a whole. In this view, if the rural areas are "depressed" almost the last persons to be sent as a rescue team would be businessmen--even though their businesses might prove instrumental in inducing economic gains. Which perspective, if either, is right depends sensitively on which questions one poses. Surely the Democratic-urban-liberal penchant to caricature business as exploitive, opportunistic, and socially destructive is overdrawn. But so is the Republican-rural-conservative antithesis. Businessmen, like

the world in which they operate, defy simple categorization.

Viewed in the light of this ideological tension, the questions raised by the Ohio County Airport Program about entrepreneurship and political resources and public policy are provocative. The Program was manifestly a product of the social vision and values held by the DOA staff. What happened, in the most literal and pervasive ways, stemmed from that vision and those values--the objectives of the county airports, who was to be drawn into the consideration of whether and where to build them, and who would be asked to contribute to their completion and operation, etc. Thus, the social evaluation of the Program is tied to the evaluation of the vision that informed it from the beginning. The question of the worth of that vision cannot be sidestepped; the task of analysis cannot simply be truncated to an appraisal of how well DOA fulfilled its objectives, without an examination of the objectives themselves. But, unlike many more massive governmental efforts, the small size of the airport program inextricably blurs the line between means and end. Each was shaped by the necessities of the other. In analyzing the Apollo program one can usefully discuss the evolution of intention and action, and the ways in which action miscarried or misrepresented intention. The DOA case resists this neat rationality, except in the crudest sense. Fifty airports were authorized; they were built. Anything more detailed draws us into the confusions of trying to comprehend individual lives and the place of ideas, values, and ideologies within them.

Perhaps nowhere was this complexity more visible than in the case of the fixed-base operators.

Fixed-base Operators

Of the businesses that DOA tried to bring to the county airports, only one was a functional adjunct to the "3,000 feet of county road". the service station for aircraft or, in aviation parlance, the fixed-base operator (FBO). FBO's in rural county airports resemble their automotive parallels, providing fuel, repair, maintenance, and "parking" services, and often also serving as dealers in second-hand aircraft.

Because of the much smaller volume of business in general aviation, as compared to auto travel, FBO's customarily branch out into related functions to earn additional income: They give flying lessons, provide charter and messenger service, sell insurance and process license applications, and serve generally as a social nucleus for aviation-related activity (comparable functions to driver training schools, taxicabs, auto-parts dealerships and custom-engineering centers for the "hot car" and racing subcultures). If the runway embodies aeronautical operations as structure, the FBO embodies the technical and social requirements of the airplane as machine.

A fixed-base operation is, by its technical nature, a small business, and the county airport FBO's have been plagued by the tribulations of small businessmen in all parts of the economy.²¹ Because of the broad array of goods and services required by general aviation craft, the FBO must bring to bear a variety of technical skills, each of some complexity. Yet in the setting of a rural airport, the volume of business overall is too small to permit much specialization or division of labor. Most FBO's seem to be able to do emergency repairs for example, though they do not have the facilities for major overhauls. Further, the technical nature of airport services is not suited to branch operations covering several airports in a given geographical area. As in banking, branch operations are suited to the bringing together of large numbers of relatively simple operations, while FBO tasks turn on the performance of a relatively small number of intricate technical tasks.²² For these structural reasons, FBO's have traditionally been organized as individual enterprises, ordinarily with only a few employees (if any) to supplement the efforts of the owner and members of his family.²³

FBO's have traditionally suffered from the economic instabilities of small businesses generally. The failure rate has been significant, and airports in outlying rural counties have had difficulty attracting FBO's to their airports--problems similar in some ways to that of attracting physicians to such areas. Without an FBO, the airport is not much more than a landing strip. Yet for most of the time since the county airport program was initiated, about 5 to 10 percent of the county

airports have, at some given time, been without an FBO. Moreover, even in counties where finding an FBO has not been difficult, there are several cases of rapid turnover, with two or three entrepreneurs in turn trying to make a go of it at the new airport.

Once successfully launched, however, energetic and businesslike FBO's can grow rapidly. The first step, according to Cornett, is the construction of a hangar, for maintenance and repair work, and to provide a cubbyhole office. The FBO usually builds and owns the hangar, paying a modest rental to the county for the land which he occupies. The rental is frequently counterbalanced by a fee charged by the FBO to serve as airport manager. Once the level of airport usage has climbed to about 10,000 operations per year, the FBO is usually in the black. (An "operation" is a landing or take-off--a traditional measure of airport activity.) The level of activity, running at about 20 to 30 operations a day on the average, has been fairly readily attained, and several of the county airports now have traffic volumes ten times as large.

After going into the black, Cornett noted, the enterprising FBO can begin to cut into the business of urban airport service operators, by taking advantage of his rural location and its lower land and labor costs. The story of an FBO at a county airport near Columbus is illustrative. He discovered that it was possible to paint aircraft at his county airport hangar for far less than the \$1,000 charged at a metropolitan airport. The preparatory stages--mostly masking off areas which are not to be painted--can be done by local high school boys earning money after school. The painting itself can be done by a moonlighting automobile body-shop painter, who picks up \$50 for each fuselage he sprays. This is a premium rate for the body-shop man, and the simpler, though more tedious masking work is paid for either at the lower juvenile labor rate, or else is paid for in kind, by giving the young workers rides and flying lessons. This cut-rate painting scheme has drawn a lot of business from Columbus-area pilots, including Cornett himself.

As one might expect, the county government usually finds it in its interest to have a successful FBO, and is willing to provide subsidies

to new businesses trying to become established. A good deal of DOA's activities after the airports have been dedicated has been aimed at finding FBO entrepreneurs, and of arranging suitable agreements between these businessmen and the communities which oversee the airports.

As a rule of thumb, Cornett guessed, the yearly maintenance of an airport runs to several percent of its initial construction cost. The Ohio county airport experience has been that the costs of mowing grassy areas in spring and summer, and of plowing the runway in winter, and miscellaneous airport upkeep tasks have amounted to about \$3,000 per year. While these costs are the responsibility of local government, they are frequently contracted out to a new FBO, to provide him a source of steady income during the early years. Later, when the FBO has acquired a steadier and larger business, the rent and property taxes he and other commercial and industrial airport neighbors pay will support maintenance costs easily, with surplus left over. The precise arrangements vary. In one case, Crabtree noted with amusement, the county had had to build a structure to house snow plowing equipment. They chose to build the storage shed near the end of the runway of the county airport, so that on the way out to the road, the plows "happen" to keep the runway clear. In another case, the rent charged an FBO exactly counterbalances the management and maintenance fee paid him by the county.

Establishing the FBO as a viable business often takes a substantial period of time. DOA officials openly admit the need for county subsidies, sometimes lasting several years. In the longer term, however, it is clear that FBO's are expected to be business successes, as gauged by the marketplace. In the cases of FBO failure witnessed by Crabtree, he said that shortcomings on the part of the FBO were responsible, not problems in the county governments. This judgment--which is at odds with the accounts given by the FBO's themselves--is consistent with the view that FBO's are businesses first, public services second.²⁴ But the perspective does seem to shift through time: In the early period of the airport, the FBO provides an important advantage in terms of attracting general aviation traffic and as an adjunct to businesses using

the airport; later, with prosperity and higher traffic volumes, several FBO's might appropriately handle available business--and here the laws of the marketplace should be given prominence.²⁵

As before, we need to supplement this abstract economics with the realities of the personal relationships between DOA staff, the FBO's, and local officials and airport users. From the DOA point of view, each pioneering FBO venturing forth to a new county airport was someone deserving a break, and the warmth and personal contact characteristic of Crabtree and his men extended to FBO's much as it did to county officials. Yet the FBO situation was one about which DOA could do relatively little, except provide moral support. Sometimes, the need for an FBO led to misjudgments on all sides. In Appalachian Jackson, a fast-talking corps of moonshiners made some flamboyant promises and got themselves appointed concessionaires to provide airport services. Before they could provide those services--and use them as a cover for bootlegging whiskey into Ohio's urban markets--DOA got suspicious, alerted the Jackson airport commissioners, and called off the deal. Evidently, DOA showed a good deal of tolerance of local enthusiasm for airport management programs of some originality. The penchant for local autonomy was showing up strongly in this, the most independent phase of the relationship between the state government and the local community interests responsible for the airports.

The Community Stake

The consistent theme of the implementation program for the airports was the development and vesting of a local community concern for the county airport. The major job of DOA, apart from the technical supervision of the details of the airport, was to teach a sensible conception of what the airport meant, in terms of community life, to those who would be affected by its construction and use. When "Rhodes' Raiders" reached outside the state to draw in business, this teaching was extended to future members of the communities as well--though the airports, when they were mentioned at all, were discussed only in terms of their contribution to transportation services for business. The word to describe

what DOA and Norman Crabtree did is "teach" rather than "transmit," because the development of the conception of the airport was a two-way process in an important sense. Although Crabtree and his men were far from shy in their advocacy of the county airports, they also attended to the hopes and desires of people in the towns. Much of this is no more than good salesmanship.

The county airport as a tool in a plan of statewide economic development raises at least two kinds of questions. First, whether the perception of the airports and the promise they seemed to hold to DOA were shared by the communities which agreed to take part in the Program. The studies reported in Part III of seven towns where airports were built suggest that here intensity of expectation was rather weaker than one might have expected, based on DOA's enthusiasm. More generally, the field studies demonstrate the far greater complexity and variety of responses occasioned by the airport, as compared with the language of DOA's entrepreneurship. Second, one might wonder whether other governmental and private agencies perceive the scope of technological action to be both so broad and so fundamental. This elusive question is our next concern.

NOTES

¹ Everett M. Rogers, *Diffusion of Innovations* (New York: Free Press, 1962) summarizes a large body of work, much of it dealing with agricultural innovations.

² For an analytic perspective on this kind of approach to community life, see Norton E. Long, "The Local Community as an Ecology of Games," in *Perspectives on Urban Politics*, ed. Jay S. Goodman (Boston: Allyn and Bacon, 1970) pp. 9-26; originally published in the *American Sociological Review* in 1958. Of course, the staff of DOA had a far more intuitive--though perhaps no less effective--view of the community dynamics in which they took part.

³ As we shall see more fully below, there was little *programmatic coordination* among potential avenues of development.

⁴DOA placed great significance in having the airport project formally handled by the official county government, however. To be sure, there was not always perfect coincidence between the county commissioners and the "natural" leaders of the community.

⁵The landing-fee restriction is intended to make county airports attractive to general aviation pilots, who face increasingly steep charges to land at fields serving commercial airliners. Levine, *op. cit.* (See Chapter Three, note 16.)

⁶Compare the analogous perception of auto routes in the early days of automotive travel, as described by Norman Moline, *Mobility and the Small Town, 1900-1930*, Research Paper No. 132, Department of Geography, University of Chicago, 1971; esp. Chapters 3 and 4.

⁷The odd discrepancy between road and runway construction techniques is found in several other technological areas, according to Crabtree. He blames the lag in the aeronautical camp on regulation by the FAA, which he attacks for being overcautious and technically incompetent; The federal agency's "diseconomies" in this instance seem consistent with Crabtree's overall view of it.

An alternative--though not inconsistent--explanation grows out of the fact that airport surfaces have been designed for much heavier loads than have road surfaces. Not only are aircraft themselves heavier, but the impact of landing and the exposure to the chemical and heating effects of jet wash at take-off also impose rather different burdens on runways. Accordingly, it is likely that runway designers would not think of turning to road designs, which tend to be designed much more to economic constraints simply because of the enormous needs in maintenance, expansion, and replacement of roads. In addition, general aviation airports are a minor part of the runway design engineer's professional purview--certainly not an area where a professional reputation (as an engineer) is easily made. For all these reasons, DOA's happy discovery that road designs meant to handle heavy-duty trucks would also do for light planes may reflect more the special *institutional* setting of the Ohio county airports, rather than others' oversights.

⁸Thus in an odd sense the Ohio airport innovations were aimed at economic rather than technological advance. The main goal was not a better mousetrap or landing light, but a cheaper one which could do roughly the same job. Note the use of this distinction in Dennis C. Mueleer and John E. Tilton, "Research and Development Costs as a Barrier to Entry," *Canadian Journal of Economics* 2 (1969), 570-579.

⁹For a lucid introduction to the economic context, consult Richard Caves, *American Industry--Structure, Conduct, Performance*, 3rd ed. (Englewood Cliffs, N.J.: Prentice-Hall, 1972).

¹⁰See, e.g., Mueller and Tilton, *op. cit.*, and Rogers, *op. cit.*, esp. Ch. VI.

¹¹The tailoring that was done, it should be emphasized, was as much a matter of *packaging* as of specific engineering design or social rearrangement. As the field studies demonstrate, the airports never elicited enough articulate concern to occasion major revisions of the airport concept. That concept, which included recreational airports, was not monolithic of course, and it seemed to have room enough to accommodate the range of community concerns which did surface.

¹²Murray Edelman, *The Symbolic Uses of Politics* (Urbana: University of Illinois Press, 1964), esp. Chap. 1.

¹³Cf. the discussion of "intensive" and "mediating" technologies in James D. Thompson, *Organizations in Action* (New York: McGraw-Hill, 1967) Chap. 3. The DOA task was carried out using an intensive form of organization.

¹⁴Cf. the discussion in Francis E. Rourke, *Bureaucracy, Politics, and Public Policy* (Boston: Little Brown, 1969).

¹⁵In one community, opposition was led by an individual who happened to be employed by the local branch plant of a corporation which wanted to expand its use of air transportation. When DOA officials became aware of his role, they complained to his corporate headquarters, squelching their opponent--and the opposition movement.

¹⁶Cf. Robert L. Heilbroner, *The Limits of American Capitalism* (New York: Harper Torchbooks, 1966).

¹⁷For a review of the arguments, and a defense of some of the new proposals, see Warford, *op. cit.* (See Ch. Three, note 15.) See also Levine, *op. cit.* (See Ch. Three, note 16.)

In our interviews we talked to Nat Simons, a transportation planner with the Ohio Department of Transportation. Several years earlier, while he was employed by the Battelle Columbus Laboratories, Simon had done a study of the new anti-congestion proposals, a study sponsored by the General Aviation Manufacturers Association, a trade group opposed to the new plans. Simons concluded that the economic arguments in favor of the proposals were too firm to oppose straight out. Instead, he recommended to the light plane manufacturers that they organize as a political pressure group, in order to protect their interests. This latter path has been followed, as the revisions in fuel allocations for general aviation in the 1974 energy shortage demonstrated. What is of particular interest here is that DOA found itself with a way of being

responsive to general aviation interests, without becoming directly embroiled in the congestion controversy.

¹⁸ In 1972, when Governor Gilligan proposed to reorganize the several state agencies dealing with transportation into a new cabinet-level Department of Transportation, the plan was stalled when general aviation lobbyists--without Crabtree's concurrence, apparently--launched fierce objections. They were fearful of DOA's getting lost in an agency which would perforce be dominated by highway interests. After receiving assurances from the Gilligan administration--and Crabtree--that this would not happen this group no longer opposed the reorganization plans.

¹⁹ One can often know what is impossible, and that is very important if only because it is so often ignored. New factory developments, we now know, cannot be perfectly free of environmental side-effects; in the overwhelming majority of cases it would be far too expensive to eliminate all environmentally deleterious attributes of an industrial operation. Knowing that, it is irresponsible to ignore it as a factor, perhaps outweighed by others, in analysis. But the question of environmental impact is a new one; before its asking had become part of the process we now call "development under normal government controls," responsibility or irresponsibility was simply not at stake--there was no concern to be responsible about.

²⁰ At one point, Crabtree complained about the mechanization of weather forecasting services for fliers. Ever the pragmatist, he complained that the forecasts were no longer as accurate or as informative as they were before--when one could query the weatherman directly. But he acknowledged too that the lack of human contact was much of what he missed.

²¹ For a review and appraisal of the literature of small business, see Kenneth E. Mayers, "Ghettoes, Incorporated: A Theoretical Case Study of Black Economic Development," (unpublished dissertation, Department of Political Science, University of California, Berkeley, in progress.

²² There may be significant spreading of aircraft costs, however, for FBO's offering charter services from several outlets. This is seen, though not frequently.

²³ It may be useful here to compare the automotive case, in which the volume of fuel sales and the relative simplicity of auto engines make the economics of fuel retailing a good deal more important. In addition, legal settings in most states have facilitated vertically integrated gasoline marketing systems, so that most "service" stations are primarily gas stations owned or franchised by major petroleum companies. Accompanying this different emphasis on fuel sales is substan-

tially more differentiation in the support services for automobiles--ordinarily sales, insurance, repairs, and custom alterations are handled by different firms, even in smaller towns.

²⁴Moreover, Crabtree's position reflects the common complaint that too many FBO's are merely pilots, too caught up with the joys of flying to run a business with enough aggressiveness. For an example of this view, see Robert B. Sanderson, "The CPA Looks at the FBO," *Airport Services Management* (September 1972), pp. 25ff.

²⁵Compare the "scale and risk" arguments advanced in favor of public support of research and development. Public support of the FBO serves a similar short-term purpose.

CHAPTER FIVE

BEYOND THE GRASS ROOTS:

POLICY IMPLICATIONS OF THE OHIO COUNTY AIRPORT PROGRAM*

The Ohio County Airport Program appears, in retrospect, to be strikingly different from conventional images of our public programs. In order to focus more sharply on the uniqueness of its process and its products, it will be helpful to make some suggestive--though rough--comparisons of the Ohio Division of Aviation under Norman Crabtree's leadership to three of Ohio's other governmental activities: (1) *the vocational education program*, an extensive family of government financing and assistance efforts, aimed largely at rural development (which, with its broad focus on social development as well as its seeking a solution in technical knowledge is at least superficially similar to the county airport program); (2) *the Appalachian Selective Development Program*, part of a Federally funded regional planning effort embraced by the Ohio Department of Economic and Community Development (DECD); and (3) *Ohio's relations with the railroad industry* (an informative point of comparison if only because of official engagement with another transport mode). These comparisons, in turn, will prompt some more detailed analyses of the airport program--as an organizational, political and technological undertaking.

A convenient framework in which to compare these different activities is one adapted from the work of sociologist Talcott Parsons.¹ It distinguishes among *technical*, *managerial*, and *institutional* levels of social--that is, organized--activity. The technical core of an organization includes those elements and persons engaged directly in the main productive work of the organization. In the county airport program, DOA's roles in runway design and in approving grant applications illustrate activities lying in the technical core. They contributed directly and fundamentally to the main goal, having an airport when the activity was concluded. The

* Contributed by Kai N. Lee

managerial level comprises activities aimed at the direct supervision and facilitation of technical-core activities. The assembling of additional resources to supplement the state construction grant was a managerial contribution by DOA to the county airports which reached well beyond the normal role of a state grant-making agency. At a more general, institutional level, activities are organized around long-term strategic choices and wider-ranging political matters concerned with the relations of the organization to agencies, etc., in its environment. The bond issues with which Governor James Rhodes financed capital construction are, in this sense of "institutional," an institutional instrument, representing long-range and politically significant choices about how the state of Ohio should finance public investment. The DOA's involvement in encouraging the passage of the bond issue including monies for the airport program clearly falls into the institutional category.

The three levels are often not sharply distinguished, nor need they be. Indeed, it should be kept in mind that the boundary between, say, the technical and the managerial is frequently--and significantly--unclear. More than that, sometimes a particular activity will have an institutional character in one setting, while it will be more accurately called managerial in another. The bond issue which first breathed life into the airport program is of institutional significance to the DOA--it enabled the airport program to be instituted. Yet from Governor Rhodes' viewpoint that *particular* bond issue was a way of serving his short-range political goals, and thus it was a management device in that setting. A theme of the analyses put forth here is that the tension among these broad functional categories of technical, managerial, and institutional is a creative one, for it is in the gray area between a technical and a managerial decision that opportunities emerge, and are sometimes seized. Thus, Crabtree, with the assistance of Jess Howard, turned the managerial problem of acquiring lighting equipment into an economically soluble technical problem, with savings to the counties and profits to Alnaco (see Ch. Four, p. 108). While not all opportunities arise in the cracks and overlaps of these activities, we shall be rewarded by looking for them there.

It needs stressing that the comparisons made here are made for purely instrumental purposes. The aim is not to portray a government program comprehensively, but rather to use its form and contents to highlight salient features of DOA. At minimum, then, our investigation of these programs is incomplete. Moreover, the three comparisons we made took these programs strictly as targets of opportunity; the set of three is not meant to be representative, only illustrative.

Vocational Education

Housed within the massive administrative apparatus of the State's Department of Education, the Division of Vocational Education (DVE) shows both similarities and instructive major differences from DOA. Ohio has long had a reputation as a leading state for vocational education. Despite this tradition, the participation of students in vocational education curricula has shown the long term declines characteristic of the national trend. Put in the broadest, sketchiest terms, the expansion of higher education during the postwar era decisively favored academic curricula in secondary schools. Increasingly, for a high school student to choose a vocational education track was to close off attractive options, or so it seemed. Some reappraisal of the economic worth of a college degree has come out of the fiscal uncertainties of the last several years. But in Ohio the Rhodes administration, with its commitment to the ethic of industrial development and work, had anticipated this switch. With gubernatorial and Republican legislative support, both enabling legislation and appropriations were passed in the late 1960's, laying the groundwork for a greatly expanded vocational education program.

Characteristically, the Rhodes-backed measures called for the construction of new facilities. DVE will, over the next several years, disburse several hundred million dollars to vocational school districts, to build and to equip new buildings. As in the county airport bond issue, the enabling legislation for vocational education requires that the fiscal benefits be widely spread. Each Ohio county is required to have

a new or improved vocational program. Accordingly, the vocational educational thrust is aimed at both urban and rural employment problems; here, we shall pay primary attention to the rural part of the program.

Paralleling the reliance on communities for arrangements with FBO's and other aspects of the routine operation of county airports, the DVE program establishes minimum criteria for vocational education curriculum, but does not call for much close supervision. The substantive contributions to curriculum innovation are built around teacher conferences held in Columbus, at which groups of teachers from around the state gather to learn about curricular plans and DVE assistance capabilities.

At the institutional level, the overall political and social aims of DVE are similar to those of the county airport program. The purpose of vocational education is to provide trained workers for industry, a secondary, but important, goal is to avoid infringing upon labor markets dominated by established trade unions.² Economic development is the explicit aim of vocational education. These pragmatic concerns--together with the benefits of DVE funding to communities where new facilities are to be built--are the mainstay of DVE's relationship with the Ohio legislature, which has continued in the Gilligan administration to appropriate funds for vocational education upgrading.

Yet while the political support for DVE resembles that which supports DOA, DVE's stance seems much more routinized, much less a matter of individual charisma, than is DOA's case. One gets the unmistakable sense that the vocational education program would continue on, largely undamaged no matter what the fate of agency leadership or damage to the reputation or credibility of any official, no matter how high. In the county airport program, by contrast, it would have been far likelier that the program itself would have been scrubbed, if Crabtree's credibility as DOA director had been challenged in connection with the airports. Certainly the bravura of a fire-us-all bet with the legislators was not evident at DVE.

The routinization of activities in DVE carries over as well to managerial and technical-core activities. In all respects, DVE is a

far larger organization than DOA, and the formality of bureaucratic processes is evident throughout. The curricular guidelines, calling for at least twenty courses, distributed over at least twelve different career tracks, suggest the much greater administrative (if not substantive) similarity among vocational education schools. Each vocational education program could be different, as could each county airport's FBO concession. But to DVE, the differences were, within wide bounds, irrelevant to the state agency. For DOA, each county's arrangements for public services was part of the tailor-made situation of the county, an intrinsic part of DOA's relationship with members of the community, and an intimate part of what DOA staff knew about the town and the airport.

Planning for Economic Development

Where the vocational education program had a long-range mission similar to that of DOA, our next comparison case shared with DOA a common managerial problem. helping local community leaders to spur economic development.

As part of the Johnson Administration's anti-poverty program, a multi-state Appalachian Regional Commission (ARC) was established in the mid-1960's. Comprised of the governors of the member states, ARC's task was to encourage economic development with federal planning and seed money. One recent project, completed by the Ohio Department of Economic and Community Development in 1973, was the Appalachian Selective Development Program (ASDP). The stress in ASDP was on the word "selective": the program was a conscious attempt to match opportunities for economic growth with the particular needs of the rural Appalachian communities of southeastern Ohio. To do so, DECD staff used relatively sophisticated information processing and analysis methods, together with regular, structured contact with community business leaders.

ASDP provides an instructive illustration of contemporary professional planning as a mode of guiding economic development. It shows a rather different--and Democratic--face of DECD than the barnstorming of Rhodes' Raiders. A DECD staff member, comparing ASDP to the wide-open style of Neuenschwander's days as director, called it a shift from a

"shotgun" to a "rifle" approach. To the Rhodes men, implicitly, any development was good, so long as it had the support of the local community. In ASDP, by contrast, the presumption was that organized economic and demographic knowledge, together with the insights of professional planners, could improve the quality of development, as measured by a variety of social indices.

The conception of the community and region built into ASDP reflects this rather different style of development. The basic analytic tool in ASDP was a "regional potential model," originally developed by researchers at the Battelle Memorial Institute in Columbus, and applied in ASDP to the 28-county Appalachian section of Ohio. The regional model assembled in computerized form data about the existing industrial base, labor force, natural resources, utilities, transportation, and other economically significant aspects of the 28 counties. The computer model could then be used to do two analytic tasks. First, it could assess the economic viability of a new industry in any of the 28 counties, judged against the existing stocks of economic resources. Second, it could identify a set of locations within the counties suited to a given new industrial enterprise. In this way, both industrial firms interested in locating in the region and community leaders desiring to attract new business could estimate the chances of economic success, aided by a quantity of information organized along statistical lines.

This more abstract and quantitative view of the developing community provides much of the same information which passed between local and state government and industrial prospects during the more traditional Rhodes administration. What is different, from the planner's perspective, is the broader regional view that the regional potential model facilitated. At its best, such a planning approach would have led to economic development balanced and distributed throughout the Appalachian region.

What is significantly different from a sociological perspective, however, tends to illuminate the discomfort of Rhodes' Raiders with this managerial style. In ASDP, the middleman role of state government is intentionally antiseptic. The abstractions of the regional potential

model are interpreted by planners who perceive themselves as neutral, more or less scientific, *experts*, ready to help the facts "speak for themselves." By contrast, the aggressive brokerage of Neuenschwander's DECD was conducted by men confident of their duties as *representatives* of community and state interests. Both expertise and representation fall short of the ideal, of course. The regional model's statistics tend probably to overemphasize the present levels of activity at the expense of the potential which may "really" be there.³ Clearly, the planner's analytical insights, while often helpful, are rarely determinative. However loudly the facts speak for themselves, they hardly ever demand a particular pattern of development or the choice of a particular site. The political approach too has faults. For instance, the overall economic and political interests of state government may conflict with the perceived or genuine needs of local communities. There may also be more than preference that leads rural-minded Republicans to favor the barnstormer approach. It is likely to be more effective as a *political* link between state officials in a Republican administration and the preponderantly Republican local governments. This consideration, however, is at best of tangential relevance to the balanced economic development of the region.

What is important here is not that neither approach is perfect. Rather the useful point is that they have strengths and shortcomings which tend in rather different *institutional* directions. ASDP staff took their regional models out to local community leaders, only to find that these businessmen wanted sophisticated, clean industries such as electronics. These, however, are precisely wrong for Appalachia, from the economic and technical point of view of the planner. Such industries require good communications and rapid transportation, highly skilled labor, and lots of capital--none of which are available in poor, mountainous Appalachia. Sadly, because ASDP was a sophisticated-sounding effort, hopes for it were high in the local chambers of commerce. The hopes were so wide of the mark, from the planner's point of view, that they could not be met. This sort of dashed expectation, fairly common in attempts at regional planning, may be contrasted with DOA's use of

the prestige of an airport in securing community support. The folksiness of a fly-in dedication seems a distant counterpoint to the ASDP's final report's conclusion that "community spirit was simply not strong enough to bring about social and economic change."⁴ If one could settle for hoping for constructive change instead of trying to bring it about deliberately, the prospects seem more favorable. But it is a long way to step back, to go from planning to mere hoping.

Interestingly, Crabtree and the formal planner both agree that the key problem of rural development is lack of leadership. We have noted earlier Crabtree's belief that new business brings new elites to revivify community life. Virtually any business can do this, since the point is not so much that the newcomers have particular skills, as it is that they bring a broad intelligence and the energy to get things done. ASDP's remedy, by contrast, aims at equipping present-day elites with aid from a central planning and analysis office. The two "cures" are not, to be sure, mutually exclusive. Indeed, they tend to complement one another. Yet the rational managerial style of ASDP has had mixed success at best. Information by itself does not make up for a deficiency of enthusiasm. Four hundred speeches advertising a new airport program seemed to do better. To use our typology: When the problem is institutional (weak leadership), it may not be possible to solve it using managerial improvements (better analysis) alone.

Rail Transportation

Finally, it is instructive to look at DOA in comparison with another government activity which seeks to regulate, since regulation is, in a day-to-day sense, the technical basis of DOA's governmental mandate. What stands out in such a comparison, of course, is how closely rail regulation has been restricted to narrowly technical regulation of the economic activities of the railroads.

As throughout America, rail transportation in Ohio has been in an unrelieved decline since World War II. In common with much of the industrial Northeast, Ohio has an extensive network of rail trackage. One

would think, therefore, that an industrial development strategy would have tried to promote the State's rail facilities. And in fact, DECD promotional literature pays a good deal more attention to railway track and spur availability than to airports. Yet there is evidently far less attention paid to railroads as an item of state *development* policy.

At one level, the difference between rail and air lies in the difference between regulatory and public works policies. Railroads are perceived to be private businesses first and foremost, notwithstanding their regulation as public utilities. The development of the rail network, accordingly, is not subject to much public guidance; presumably, the market will do what guiding is needed. An airport is a public facility, by contrast. There are political gains, and perhaps more important there is public benefit, to be found in building airports. In a more pointed case, airports share the public character of highways. The enormous sums spent on highway development have far outweighed evolutionary changes in rail or air as a force in rural development. The building of roads, in turn, has brought strong competitive pressures to bear on railroads, pressures which the rail companies have by and large been unable to meet.⁵ So far, however, the growth of the highways has created, if anything, a *better* climate for rural industrial uses of aviation, since the highways are suited to routine transport of massive quantities of goods, while the airways provide speed for people and specialty items.⁶

The interrelation of different modes of transportation is influenced by cultural shifts subtler and stronger than economic advantage or the distinction between public and private ownership, however. The decline of railroads is a far more complex matter--if only because it has been so pervasive--than we have time to discuss here. It is reflected, however, in the restriction of state government policy to economic regulation of the railroads. Sometimes, of course, the regulatory apparatus is used for ends other than rate-setting. One DECD staffer recalls a time when he lobbied to make Penn Central restore a washed-out bridge. Penn Central had applied to the public utility commission to abandon the line which had included the bridge, arguing that reconstruction would be prohibitively expensive, and the line had been losing money

anyway. At the behest of an industrial concern reluctant to lose freight service, DECD privately urged the public utility commission to reject the application. The pressure was heeded, and the bridge rebuilt. Yet this incident is memorable chiefly because it is rare. One thinks DOA would be somewhat more actively concerned if a runway fell into disrepair and the FBO applied to terminate his concession agreement.

Much of the economic and institutional critique of regulatory activities has concentrated on the difficulties of fairly and effectively protecting the public interest in regulated industries.⁷ Within our comparative frame, the significant point is that regulation can be restricted to a technical undertaking, as in the routine setting of prices; or it can be used for managerial ends, as in the case of the washed-out bridge; or a regulatory mandate can be the background for promotional activities of varying vigor--and DOA provides an extreme institutional case of promotional enterprise built on top of regulation.

ANALYSIS: INTERNAL STRUCTURE

Our three eclectic comparisons exhibit differences between DOA and three other government organizations or activities at the institutional, managerial, and technical levels of action. This tripartite division of organizational activity adapted for use in organization theory helps to distinguish among the effects exerted by the technology and the environment of an organization upon its form. The terms "technology" and "environment" have specialized sociological uses here. To oversimplify, the technology includes those necessities imposed upon organizational activity by the mission of the organization--as automobile assembly leads "naturally" to the assembly line form of organization. These activities form the organization's technical core. And the environment of the organization encompasses all the forces outside the organization, whose effects alter the course of behavior inside the organization. And these forces take up much of the attention of the organization's institutional activity. Federal tax policies, for example, are an environmental force acting upon all major corporations.

Thompson argued that in cases where the technical core could be insulated from the environment's disturbances, the organization would attempt to do so. This insulation may be observed in the distinctive forms taken by the technical and institutional levels of the organization. The technical core, insulated from fluctuations by a variety of managerial devices, would look more or less like the classic bureau described by Max Weber. At the other limit, the institutional level, buffeted by the environmental pressures, would resemble the fluid "complex" organizations studied in recent years by sociologists. The managerial level, mediating between technical core and institutional superstructure, would be shaped to handle the more-or-less rigid technical core on one side, and the more-or-less fluid institutional level on the other.

Thompson's analysis, in associating a particular functional activity with a discrete *part* of the organization, aims at describing large organizations. Indeed, the characteristics we noted above in the vocational education program correspond well to the differences Thompson predicts between core technical and institutional action. The procedures for obtaining vocational education construction funds are much more highly routinized than the political reassurance of a legislator. In the Division of Vocational Education, these tasks are handled by different parts of the organization, and there is a clearcut separation of function. The Division of Aviation, by contrast, is a small organization, in which separations of function are far less feasible. *The various institutional, managerial, and technical activities are much more tightly interwoven in DOA.*

Consider, then, the force of our comparisons in view of this interweaving and the suggestion made earlier that *at points where levels overlap there may be unusual opportunities.*

1. The freewheeling institutional style of DOA *derives from* the overlap of these activities and the small size of the Division. The fire-us-all bet with the legislature clearly could not have been made credibly in a large bureaucracy: it was a believable gamble only because Crabtree could have intimate control and awareness of the technical and managerial levels of DOA responsibility. This is an instance of the *institutional opportunities*

2. At the *managerial* level, our comparison with ASDP suggests that the regional planning scheme of the latter fell short because the legitimacy of ASDP depended too heavily on a technical core which was only partly able to cope with the institutional problem of weak local leadership. DOA had greater success because it could not only draw upon a secure technical core--the runway design part of the program--but could also play directly upon the institutional strengths of an official state agency. When the DECD staff had the ear of the Governor and the enthusiasm of the Director--as under Rhodes and Neuenschwander--its development policy could also follow this type of institutional style. DOA's ability to draw on combined technical and political legitimacy continued, for the director of the development agency was always willing to lend his title to DOA business, since he would often be its initiator and principal enthusiast.

3. The *technical* part of the county airport program benefited from the strengths of functional overlap and a small organization in two ways. First, the close coupling between institutional and technical concerns ensured that DOA could go beyond the regulatory function that is its basic delegated task. This latitude has been sketched in the comparison with railroad regulation, as well as in the earlier discussion of DOA's organizational texture. Second, development of the road analogy in the engineering of the county airports could not have proceeded so swiftly as it did without the active support of the managerial and institutional activities of DOA staff.

These three interpretations, drawn from the portrayal of DOA above, give us perspective on two more general themes: One, that small organizations have opportunities unavailable to large ones; the other, that some of these opportunities may be found in the overlaps between functionally distinct activities which in large organizations are assigned to separate internal units. Put this way, the three observations regain some of their common sense character. For indeed, there should be nothing surprising in either of these themes. Crabtree's success in the

county airport program is at least partly the successful exploitation of opportunities that were there; his skill was to find and to develop them.

Lest we seem to be deprecating the achievements of DOA, it will be instructive to make another systematic comparison. DOA undertook a harder task than did the three agencies to which it was compared. Instead of a conventional relationship with a watchful legislature of the sort DVE had, Crabtree made his wager. Instead of relying upon the safety of established demographic and economic data, DOA reached out to create coalitions of variegated local resources to supplement the state grant. Instead of resting content with the "quiet life" of regulation, DOA plunged into development--a turbulent and uncertain venture. To be sure, in each of these cases necessity was in a way the mother of invention. A small agency in a relatively unimportant policy area must gain attention in order to get ahead, while a major agency administering vocational education has more attention than it needs. An agency in a business-oriented Republican administration cannot rest content with analysis--as the latter DECD, with its greater sense of caution, found it sensible to do. A "quiet life" of regulation is no *career* for a government official if those who are regulated do not form an industry coherent enough to provide later employment--as the transport industry has done for many years. Notwithstanding these necessities, it seems far too simplistic and mechanical to ascribe to these factors a *causal* role in the county airport program. Opportunity's knocks, whether single or in tattoo, are not heard by all, let alone heeded.

To put it a bit bloodlessly, DOA under Crabtree has characteristically shown a penchant for uncertainty--or, to give it its due, adventure. But what seems adventurous to a small, tightly knit organization may be threatening uncertainty to a large one. That is why DOA made no attempt to separate institutional and technical functions, no attempt to insulate the technical core. For what in large bureaucracies is something to be protected from destructive fluctuation can be, for a small agency, something to be exposed to the heady ferment of opportunity.

ANALYSIS: EXTERNAL PATTERNS

The simple distinction among institutional, managerial, and technical levels of activity can be used to explore the external relations of DOA as well. In order to do so, we shall need to introduce briefly some ideas about the relationship between public policies and the political responses they elicit. The sociological analysis developed by Thompson would naturally lead us to a consideration of the institutional and managerial levels as the principal links between the organization and its environment, the core technology, according to Thompson's basic assertion, having been to some extent insulated. Yet when the organization is a public one, the core technology--what the organization does--is most often some form of "working on" the public. Licensing bureaus provide an obvious example: their work is to deal with the public, one by one, in the name of the people as a whole, regarding a particular activity needing licensure. In such cases, all three types of functional activity may relate directly to the organization's environment, and thus to the political currents which lap at or buffet the organization.

Surprisingly little is known about the systematic relationship between a public policy and the kinds of political activity associated with it. Thus, though common sense suggests that the political response to a social security measure differs somehow from that attending a tariff bill, these differences have only been partially systematized and described. We shall here use a framework developed by political scientist Theodore Lowi, and subsequently elaborated by several others.⁸ Lowi's is a classification scheme, sorting public policies into four broad analytic types, each type uniquely associated with a particular pattern of political response.

The first type of policy is called "distributive." Such a policy aims at the distribution of some good across the polity. The county airport program is a distributive policy, evidently, and the requirement that the original grant be spread out over 50 rural counties was an openly political gesture reflecting the distributive character of the policy. In order for it to be fair, everyone, or nearly everyone, had to

to be able to get a share. More abstractly, distributive policies are defined as ones in which there is no short term constraint on supply: each county's application for an airport grant was weighed on its own merits, on a first-come-first-served basis until the available funds were exhausted. The distinctive style of politics associated with distributive policies is termed "mutual noninterference." In contrast to the conventional view of politics as a bargaining process, in distributive policies the bargain is a uniquely easy one to strike--vote for this because you too will benefit. To oversimplify, this is the politics of giveaway.

A second type of politics is associated with regulatory policy. Regulatory policies, including regulation itself, "deny or confirm potentially beneficial options in the future. Conflict over regulatory policy is likely to be ambiguous and shifting, since the specific content and direction of benefits and costs is not known."⁹ The fearful anticipation of general aviation pilots about the reorganization of DOA into a new Department of Transportation is an instance of regulatory politics in this sense, the pilots feared they would lose their friend at court.

An important variant of regulatory policy is "self-regulation."¹⁰ The political arguments leading to the vesting of the power to license physicians in medical boards is an instance of self-regulatory politics. The basic notion is that a group may be powerful enough to influence or even to direct the decision making process, but not powerful enough to retain control permanently. In such cases, it is in their interest to try to write the rules of the governmental game which affect them most directly. Self-regulation corresponds to the politics of vesting an interest in a particular sector of society.

Finally, policies may be redistributive in their consequences: ones in which there are direct, identifiable transfers from one sector to another. Welfare policies have this cast, since the resources to maintain the poor generally come from those who are wealthier. Redistribution elicits and reflects deeply rooted divisions in the society, such as class divisions, and redistributive politics tend to be particularly bitter as a result.

The four types of policy, and their corresponding political patterns, are shown in Figure 5-1. The analytical dimensions have roughly their common sense meanings, and it is unnecessary to elaborate them in very much detail here.

FIGURE 5-1
 TYPOLOGY OF THE POLITICAL CONSEQUENCES
 OF POLICY PROGRAMS ¹¹

		POLITICAL DEMAND PATTERN	
		<i>Fragmented</i>	<i>Integrated</i>
POLITICAL DECISION STRUCTURE	<i>Fragmented</i>	distributive (tangential interests)	self-regulation (temporary control)
	<i>Integrated</i>	regulation (long-term coalition and alignment of in- terests)	redistribution (class divisions)

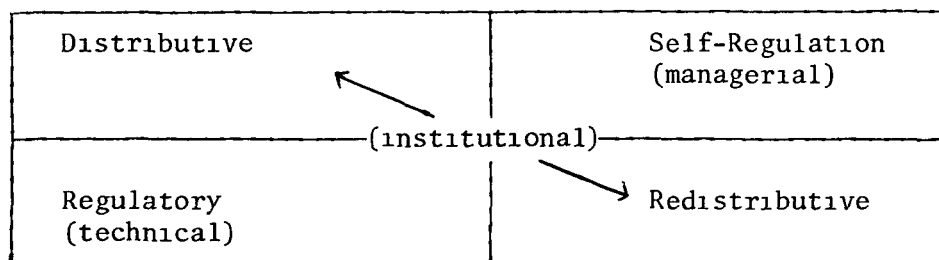
This typology remains speculative to a large extent, because it has been quite difficult to obtain reliable operational measures of the character of a public policy: how is one to know that a particular policy is regulatory instead of distributive or something else? The question is basically academic, though by no means unimportant. Here, however, it suffices to sidestep the question of the correctness of this scheme, for we shall use it as an exploratory device, in ways quite different from those originally intended for it.

We argue that a single public policy, such as the county airport program, may have a *variety* of political consequences, rather than only the one kind suggested by this scheme. This is so because most public policies have extended and complex periods of *implementation*; after the policy has been declared, the government must still carry through on the intentions

embodied in the policy. To be sure, the political issues raised in the implementation will be systematically related to the original policy, and thus it may be that, on the average, a particular class of policies--such as distributive ones--does in fact engender a particular type of politics. But here we deal with only one policy and look for signs of varying political patterns coming from its execution. It is here that we find a match with our touchstones, the institutional, managerial, and technical levels of activity.

The story of the county airports suggests that all four categories of politics in the typology above arose, at different times and places, throughout Program development. The association shown in Figure 5-2 is not a surprising one, though the correspondence between Lowi's political analysis and the sociological scheme distinguishing among institutional, managerial, and technical activity levels is satisfying. The essential point is that DOA's political relationship with the communities corresponded to various parts of the implementing strategy adopted by Crabtree in response to the opportunities presented by the situation.

FIGURE 5-2
ASSOCIATION OF POLITICAL CONSEQUENCE
AND ORGANIZATIONAL FUNCTION



The most straightforward correspondence is the interpretation of DOA's technical role in carrying out *regulatory* policy. In processing the original state grant, providing design services, and in approving a site for the airport, DOA held a pivotal role in determining the physical location and nature of the airport, yet it managed to preserve its political neutrality, by successfully keeping the decision technical.

As Thompson's organizational model suggests, DOA's neutral technical position enables the agency-community relationship to be a hierarchical one, following the classic pattern of bureaucratic relationships. And it is the shifting, uncertain character of conflict--for example, over whose land should be used as an airport site--which gave DOA an opportunity to retain that neutrality.

At the managerial level, a major goal of DOA's implementation had to be an attempt to get each airport project running pretty much on its own, lest DOA's meager resources be swamped in dealings with the communities. The effective political solution was a self-regulatory one. Crabtree's maneuvers to establish an official airport commission was a simple case of *self-regulation*, leading to the vesting of interests in the airport in a visible and politically legitimate group of local citizens. On one end, these managers of the airport project could deal with the technical requirements of the grant proposal to DOA and the runway specifications. On the other end, the airport commissioners took the lead in raising money and other resources to make the airport possible institutionally. The self-regulatory pattern gave the airport commission a mandate, and it gave DOA a group on which to devolve day-to-day operating authority.

At the institutional level, the problem for DOA was to keep the *distributive* aspect of the airport program alive, even as the airport itself became a permanent part of the community. That is, the challenge was to prevent the emergence of a clearcut group of losers, who might turn the political situation into a redistributive struggle. As noted earlier, the fly-in dedication was an important symbolic gesture helping to maintain the distributive character of the airport. Everyone was invited and encouraged to come to the dedication--and the ceremony thus became an arena in which groups with no common interest save a day's recreation became the witnesses to the opening of the airport. Moreover, in the one case where vociferous opposition to the airports did arise, DOA exerted pressure to contain the opposition and to remove it from the political arena. As we might expect from the sociological observations, the institutional level of activity was the one saddled with the most

persistent uncertainty and turbulence.

From the State's perspective, the airport program as a whole clearly took on a distributive cast. The players in the game were all in very small, highly fragmented groups on the state scale, and the decisions they made were likewise disconnected from one another. Those two airports five miles apart stand as monuments to political fragmentation. But if we look more closely at the pattern of implementation, the Lowian scheme does provide a useful inventory of political patterns to be discerned. It should be noted, of course, that an inventory is not yet a functioning theory. The use of an economic development rationale for the airport adds a second kind of distributive character to the program as a whole. The fact that this layer of the policy was heavily symbolic suggests that the political response was importantly affected by what different people thought the airport represented.¹²

The measure of order one can bring to this rather detailed historical narrative is of great use, both intrinsically and to make explicit the underlying theme of the county airport program itself. For the order we can discern with these concepts is a *political* one: In ways drawn from both the formal symbols of government and the informal activities of public spiritedness and economic self-interest, the county airports were seen throughout as public, collective undertakings. That was not their only face, and in fact it took a healthy dose of salesmanship even to expose the public character of the program. Once it was exposed, moreover, it became readily assimilated into the practical, ordinary lives of members of the community. For the technology represented by the airports, anyway, the exotic nature of what was technical did not itself become an issue. Even though the prestige of an airport continued to be an element of public support, the direct effects of the airport, such as noise and pollution, seemed not to have become issues around which major conflicts developed. What was more important was the pragmatic estimate of the airports' long-term economic and social consequences and the development they would bring to rural Ohio. As we have noted a number of times, the word "pragmatic" is not at all the same as the words "scientifically provable." The airports were offered, not within a framework of assured benefits, but within the setting of open, hopeful

opportunities. In a less cynical age, one could more readily see in such hopefulness the promise, and the modesty, of a political vision of technology.

NOTES

¹By James D. Thompson, *op. cit.*, Chapter 1. (See Chapter 4, note 13.)

²Bricklaying courses have only lately, and cautiously, been introduced, according to DVE officials. It is a measure of DVE's cooperation with unions that this and other craft-union-related courses have been begun under the aegis of the unions themselves.

³Crabtree's impatience with this mode of planning is another facet of his dislike for the Federal Aviation Administration. FAA had regularly denied requests for airports in rural areas because of a lack of "aeronautical activity." But, snorts Crabtree, you can't "float boats without water"--the lack of activity is caused by the lack of airports, he argues.

⁴Ohio Department of Economic and Community Development, *Appalachian Selective Development Program* (Columbus, 1973) p. v.

⁵For an analysis of the parallel urban case, see Matthew Edel, *Economies and the Environment* (Englewood Cliffs, N.J.: Prentice-Hall, 1973) Chapter 6.

⁶The utility of air transportation is a sensitive function of price, however. As noted earlier, the building of interstate highways in the mountainous Appalachian regions has cut down auto travel times so much that there is little competitive advantage left in short-haul commercial aviation in this part of the country.

⁷Compare the discussion in La Porte, et al., *Progress Report to NASA-Ames* (December 1972), Ch. IV. And, for a lucid review of regulatory literature, see Roger G. Noll, *Reforming Regulation* (Washington: Brookings Institution, 1971).

⁸Theodore J. Lowi, "American Business, Public Policy, Case Studies, and Political Theory," *World Politics*, XVI (July 1964), pp. 677-715. See

also the discussions by Lewis A. Froman, Jr., "The Categorization of Policy Contents," and Robert H. Salisbury, "The Analysis of Public Policy: A Search for Theories and Roles," both in *Political Science and Public Policy*, ed. Austin Ranney (Chicago: Markham, 1968), pp. 41-52; 151-175. An application of Lowi's theory to technological policies may be found in Dean Schooler, Jr., "Political Arenas, Life Styles, and the Impact of Technologies on Policymaking," *Policy Sciences I* (1970), pp. 275-287.

⁹Salisbury, *op. cit.*, p. 158.

¹⁰*Ibid.*

¹¹Adapted from Salisbury's discussion of Lowi's theory, *ibid.*

¹²The Lowi typology provides no room for these symbolic analyses, and thus appears to be incomplete in an obvious and probably significant sense. Compare, however, Murray Edelman, *op. cit.*, especially Chap. 4 (See Chapter Four, note 12).

PART III

RURAL AIRPORTS, WINDOWS FOR THE WORLD*

Our general theoretical concerns having been established in Part I, the stage was set for an empirical investigation of the social impacts of airtransport capacity prompted by the implementation of the Ohio County Airport Program. Part II reviewed aspects of the Program at the State level. Now it remains to make those further refinements of conceptual perspective which can come only from special kinds of data gathered on-the-scene. Part III reports this crucial step in technology assessment. Our central concern continues to be with a change in airtransport capacity as a source of social change, and this section records how relevant factors were sought out among the persons, places, activities, and events who or which, *in day-to-day routine*, might experience or be colored by the county airports. But whereas in Part II the political realities represented by the development of these rural airports were uppermost, in Part III the emphasis is reversed: the airports will be subordinated to the realities of the workaday world in rural Ohio in which they may play a part.

* The chapters in Part III have been more cooperatively written than those in the other portions of this study. Reporting the important aspects of a team investigation of seven communities, each chapter was initially drafted by one or two team members, frequently amid extensive comment and additions by other members. The team member responsible for a major contribution to a chapter or portion thereof is identified on the title page of each chapter. Final editing and revisions were supervised by the Principal Investigator.

CHAPTER SIX

SEVEN COUNTIES, SEVEN AIRPORTS*

I.

"HANSON COUNTY" RURAL OHIO EPITOMIZED†

Along State Route 96, whose four lanes narrow to two 20 miles east of Statesburg, our destination, lies a section of the farmland of which Ohio is so justly proud. Fields of corn and soybeans, livestock pens, and green pastures cover the countryside. These farms are not large by the standards of other states--Ohio's average farm has about 150 acres--but the soil is rich and the climate favorable. Statesburg, the county seat of Hanson County, had acquired a new airport several years ago, and we were going there to see if the town had changed in any way as a result. Hanson's was the third of seven county airports we were to visit.

The outskirts of Statesburg are standard for small towns everywhere. the railroad tracks, the few motels and retail stores which dot the route into downtown. Further in, the town square too is the classic kind, a block square park complete with trees, benches and World War memorials, surrounded by various civic and commercial buildings. Some of these are very new, in the brick and white modern colonial style so popular in the suburban Midwest. The City Hall and the County Courthouse--both of much older vintage--are there, as well as a new bank, the Chamber of Commerce, a barber shop, and a hardware store that doubles as the Greyhound bus depot.

*Major contribution from Stuart Ross

†The story of "Hanson" County emerges from a few weeks of research in rural Ohio during the summer of 1973. This county and its inhabitants are fictitious, but their style and activities, their occupations and beliefs are based on a composite of things actually seen and heard in the rural counties of Ohio.

We stopped at the Chamber of Commerce office to pick up several handout pamphlets and to make an appointment to see the Chamber President later in the week. The pamphlets revealed that Statesburg had one AM radio station, an elementary school and a high school. Its library had been designated as a State historical landmark, and a new 100 bed hospital was under construction. Of possible interest to tourists were the facts that Statesburg had been the home of a famous nineteenth-century songwriter and that some interesting salt caverns lie nearby.

Along the four roads leading out of town Statesburg's industrial plants fan out. Hanson Machinery Company, one of those closest in, is much older and a bit smaller than the two new ones close to it--Winnamaker Plastics and Ramco Metalworks. The four plants housed in Hanson Industrial Park are all new: Delite Industries, Winslow Packaging, Matthews-Harrow Engines, and Gasketco. The industrial park has convenient access to railroads, to Route 96, and, via that, to the county airport.

The midwestern version of the small home town which so many urbanites dream of "coming home to," Statesburg is a quiet sort of place. Not as idyllic perhaps as the places depicted in television commercials and magazine romances, it is still very attractive. People say hello to strangers, everyone seems to know everyone else, and crime is infrequent so cars and houses are often left unlocked. That having time for conversation is something of a point of community pride encouraged us, for our mission was to interview a number of local notables and ask them a good many questions designed to help gauge the extent to which the newly constructed county airport had made any changes in the community.

Our interviewing began with the county agent for the Agricultural Extension Service, Roger Petri. In the two counties we had visited prior to coming to Statesburg the strategy of contacting the agricultural agent early in the stage of the investigation had served usefully. County agricultural agents generally make it their business to know their communities well, and the Ohio Agricultural Extension Service had conducted leadership seminars in many towns like Statesburg during recent years. In Hanson County this contact again proved very helpful. Petri obviously liked being in Statesburg. He had come there after serving as the extension

agent for a much more urbanized county where he had not felt much in common with the people. In addition to providing us with the names of about two dozen persons worth contacting, the interview afforded us some picturesque local color, for it was conducted at the County Fair, where Petri was helping to conduct the steer competition.

Some of the names given us by the agent were already familiar from conversations in Columbus. They included recreational flyers, community notables, and managers of companies that had used the airport. We also learned that the airport had run into local political difficulties during its construction but that worries had subsided now that it was clear that a few business firms did make use of the airport. Statesburg, we were told, had both lost a few industries and gained a few over recent decades. But people thought it a true sign of progress that some of the established firms had expanded.

Facilitated by information received from the agricultural agent, a number of interviews were scheduled. One of the first of these was with Statesburg's Methodist minister. A knowledgeable source of information on the cultural, social, and historical background of the community, this minister, like those we met in other counties, discussed the neighborhoods, congregations, social structure, and current events in terms more amenable to sociological analysis than did most other community leaders. A more complete social picture, of course, would have to be pieced together from the information gathered from many other sources, but local clergymen, like the county farm agents, were particularly helpful.

In each of the towns studied, Statesburg included, two or three families are considered the most important socially, largely for historical reasons. Statesburg's "first families," the Revsons and the Scotts, have family trees extending back to the first settlement of Statesburg in the 1780's, when John Revson owned the only store in town and Jack Scott was commander of an army outpost outside town. A few other families have local histories almost as long and so are almost as respected. These traditional families are still wealthy, or at least alleged to be wealthy. The

divisions of the last few generations must have worked some reduction of their wealth. Certainly their lifestyle seems more notable for its memorabilia than its construction plans. The current patriarch of the Revson clan is a municipal judge; his counterpart among the Scotts runs the family owned shoe factory. These families exert a leadership that makes itself felt more in social and symbolic matters than in economic or political ones. They keep a subtle social distance between themselves and others. It is clearly recognized, by everyone apparently, that anyone who has been here less than two generations, say, is still somehow a "newcomer." The persistence of such a sense of family stability and dominance seems associated with a historical sense rather unusual in these times.

At the farthest opposite point of the social spectrum, and much less visible actually, are the real poverty cases of rural Ohio. They live outside of town in shacks, farm several acres poorly, and have little contact with the townspeople. Most of the county's non-white population--only about 2%--are in this group. In between, it is hard to know much of the rank and file, the citizens on the street, because there is more variation among them. On the average this population is slightly less well educated than the average for the nation or for Ohio, much less mobile, and slightly less affluent. It is an older population, Statesburg has suffered, like so many rural communities, a youth drain. Graduating seniors go away to work in larger cities or to college and do not return. This problem is often exaggerated in the urban popular press, but it is real for Statesburg, and community leaders are trying to find a way to reverse the trend.

The minister's observations were in large part consistent with what we had witnessed ourselves in other towns and with data gleaned from external demographic studies. In politics and civic affairs, businessmen and farmers predominate. Women and minorities have practically no recognized role at all. Those who initiate change are generally the businessmen, and they occupy many of the organizing positions in town activity, such as *Chamber of Commerce posts and various project chairmanships*. Those who oppose change are often, but not always, farmers

and the senior members of the traditional families. It is evident that the informal leadership pattern differs markedly from the formal system of offices: A reputational "leadership" survey conducted by the Agricultural Extension Service for its leadership seminar found nearly unanimous agreement on who the community's "most influential" men were, and few of them were officeholders.* In fact, one of the County Commissioners did not even make the "top twenty" list. In Hanson County as in the others, the Commissioners tend to wait on consensus before they take action.

Although such information was helpful for general orientation, it was simply not related--at least not in a causal way--to the airport development. But knowing about people did provide a context for the conversations to be held with them, and these might help to fill in further the picture of the social implications of the new rural airports. Moreover, certain aspects of Statesburg's social structure--for example the lack of mobility more or less common to all rural Ohio communities and so very different from some other parts of the nation--would enter significantly into whatever understanding would finally emerge.

The Airport

A key figure to be interviewed was the manager of the Hanson County Airport (the FBO). We spoke with him at the county air terminal building and thus were afforded another look at the by now familiar admixture of the rural and the technical. The terminal has two rooms, one of which is a waiting room of sorts, divided by a counter and bare except for a desk, two chairs, and a table spilling over with aviation magazines. On the far wall is a bulletin board on which hang a few notices about past and forthcoming aviation events, four shirttails marked with the dates on which their owners had first soloed, aviation insurance advertisements, and an FAA safety poster. The room off the waiting room looks as if it could serve any of a dozen purposes but is not quite properly equipped for any of them. It has a rug, a table

*The technique of finding reputational levels was given its greatest impetus by the work of Floyd Hunter, *Community Power Structure* (Chapel Hill: University of North Carolina Press, 1953). For a general discussion of leadership patterns in a small town, see A. J. Vidich and J. Bensman, *Small Town in Mass Society* (Princeton: Princeton University Press, 1968), Part III.

with six chairs, a huge aviation map of Ohio, a hot drink vending machine, and a large, but nearly empty, bulletin board.

After the plane which had been warming up for takeoff since our arrival was finally airborne, the FBO came in to talk to us. Stan Fraser is a friendly man and seemed genuinely to appreciate our interest in the airport--both as a chance to discuss his problems and as a mark of recognition from the outside world. His story is one of effort and uncertainty, told only from his point of view, of course, but without exaggeration nonetheless. Born and reared in another rural Ohio community, Fraser had flown in the military and then settled in Columbus, where he held two office jobs. He had always loved flying and he had always wanted to work for himself, so when this opportunity in airport management came up, he decided to take a chance on it even though he was inexperienced. He had started in 1970 with one plane, several hundred dollars, and a loan.

Fraser's airport business has achieved growth but not security. He has two planes now, fully utilized, so he needs to buy a third one or lose business. Although the county commissioners, to whom he is responsible because they function as an Airport Authority, are personally very friendly to him, they are considering cutting his subsidy in the upcoming contract negotiations. Fraser's log books, though obviously not a complete record of all flights in and out, did offer some good illustrations of both business and recreational usage which confirmed his comments on the uncertainties of his business. His promotional efforts--newspaper ads, speeches to civic groups, and special events held at the airport--paid off, but not permanently. Promotion has to be continual. Fraser said he couldn't guarantee he would stay in Statesburg, the future being so uncertain.

In a subsequent conversation, Fraser enlarged on promotional necessities and market constraints.

"The market here is basically limited. There are lots of airports around, so I can only get business from within a thirty mile radius or so. To reach out any further, I'd have to have a specialty, like radio repair or some extra gimmick to my approach. Maybe I'll do that; I've

thought about it....I really don't know. In the meantime all I can do is cultivate this local area as much as possible. It's a matter of convincing people they need aviation even though they don't realize it--it's salesmanship, just like any other business. The Airport Authority? I suppose for most things we could get along without them, but they sure have helped me through some rough times. So has the Pilots' Association. Of course, it's mostly the same guys in either case."

This second interview with the Hanson County Airport manager ended as one with a former manager was about to begin. As Fraser left to give a flying lesson, a big new Buick pulled into the parking lot announcing the arrival of Erwin Delmer, who had done a stint as FBO in 1969. Somehow he was not what you would imagine an airport operator to be: Seventy-three years old, rich, not very active physically, Delmer had hardly ever flown in his life, let alone piloted a plane. ("Those damned machines? I don't like 'em.") However, when the commissioners turned to him for assistance during the year in which they searched for a permanent replacement for the first FBO, Delmer, who was willing to do whatever he could for the town (and lived near the airport), agreed to serve temporarily. He did so until Fraser was hired.

With a pencilled map, Delmer explained where the airport's one accident had occurred in 1970, where the principal drainage problems had been during construction, and why the access road had to be relocated. Throughout the conversation Delmer was very explicit about whom he liked and whom he didn't like. Among the latter were the county engineer and a recreational flyer from another town whom he thought "much too big for his britches."

Fraser's assistant, Roy Hutton, also spent some time with us and even provided a slow flight over Statesburg. He explained many more of the details of airport operation and the work schedule that he and Fraser share. (Fraser had complained that he himself had been caught up in "too much desk work" after Hutton was hired in 1972.) Hutton, about twenty-two years old, enjoys flying but regards his job only temporary, until he has saved enough money to continue his education.

Hanson County has two other airports, both privately owned. One, a narrow sod strip down the middle of a cornfield, is used strictly for

agricultural spraying and seeding operations. The Angel Flying Service has customers as far as several hundred miles away. After one of his planes had been loaded up for takeoff and before another one returned, the owner and operator made himself available for a brief interview. Interspersed with explanations about agricultural spraying and the special planes needed to do it were comments that made it clear the county airport made hardly any difference to him at all. He buys gas there occasionally or, if he has business in town, lands there, but that is all. Asked if the county airport had made farmers more aware of aviation, he thought for a moment and said,

"No, but I have."

The other private airport is a sod strip in Bennings, about 20 miles from Statesburg. It has a few tie-downs and two old wood-frame T Hangars. This airport had been occasionally used by business firms, but since the opening of the county airport, such use has fallen off. It has also lost some recreational flyers to the county airport, but about half a dozen flyers continue to keep their planes there, either because of its proximity to their homes or out of loyalty to the brothers who own it. During 1969, when the Hanson County Airport management was uncertain, a few flyers returned to the Bennings airport, and some of them have stayed. It is clearly playing second fiddle to the county airport, however. Although its survival is assured by the income from the owners' farm, this airport has been financially marginal for two years or so.

Corporations

Exploration of corporate usage of the airport began with the manager of the Statesburg National Bank, Gerald McDuffy. He had been a party to several regional flights with bank clients and others reviewing sites for potential industrial location. Though he concedes that "Most managers don't know how much aviation can help them," he is very bullish about the future of regional business aviation. As for the importance of aviation to rural communities, he again concedes that there is no way

to "prove" an airport's importance in the location decision of the corporations, but these airports were too cheap to pass up. The potential benefits were so great that not to take the small chance would have been foolish.

Though McDuffy was a native of Statesburg, he had worked in banks elsewhere in Ohio before returning to his home town and had acquired something of an "urban" outlook. He felt that Statesburg was not yet sophisticated enough in its town organizational activities, although he knew of several towns that were even more backward. He hoped (and expected) that the people would gain experience with urban institutions so they could keep up with the outside world.

McDuffy was unsparing in his praise of the airport manager, Stan Fraser, whom he regarded as a great improvement over the FBO who had managed the airport during its first year. McDuffy hinted at the legal and personal difficulties in which Stuart Newman had become entangled.

"Letting him go was a difficult thing to do, but considering his behavior we had no choice."

Because McDuffy and others had talked about the heavy use of the airport by Ramco Metalworks, we made it a point to see the company's production manager, Jack Brier. Most of the stories about Ramco's use of the airport turned out to be about that month or so in 1972 when it was fulfilling a lucrative rush contract with an automotive customer in Grand Rapids for machine parts. Most of Ramco's shipments to customers before and since were fairly routine and made by regular truck delivery. However, the company continued to rent Fraser's planes occasionally so their salesmen could fly to see special customers around the country.

"Most of these customers are located away from metropolitan centers like we are, so point-to-point flights in smaller planes makes a lot of sense," he said.

The corporation making the heaviest use of the Hanson County Airport is probably Matthews-Harrow Engines. Their operations manager, Larry Fontenette, is an active flyer himself, and his activities in pushing the early development of the airport had been encouraged by his firm.

Matthews-Harrow uses the airport extensively, for executive visits and for flying their custom-built engines in and out for repair--from as far away as Alaska. Both uses require chartering Fraser's planes, sometimes insisting on Fraser himself as pilot. The need to charter local aircraft arises nearly once a week.

Fontenette was very pleased with Fraser's services and echoed the by now familiar dissatisfaction with the first airport operator. Several business deals for Matthews-Harrow and other companies, he said, had been endangered or even cancelled because of Newman's tardiness and negative personal attitude. Fontenette is no longer as active personally in the airport as he had been, but his company remains very interested. They contributed \$20,000 to the original construction fund and another \$5,000 when the difficulties arose during construction.

Next to Matthews-Harrow in the industrial park is another airport user, Gasketco. Frank Marks, the president of the firm, had been a pilot himself until a heart condition ruled out flying, and in general he looked favorably on business aviation. In his small, panelled office, he talked about his firm's use of the airport. Circumstances were such for Gasketco, he said, that extensive use of aviation did not make financial sense. The company had used the airport--that is, Fraser's charter services--only two or three times a year. Those times were all for emergency shipments of gaskets to automobile manufacturers in Detroit. Otherwise, because most of Gasketco's markets are fairly stable and predictable, it has little use for the special advantages of aviation. Marks had made a small contribution to the construction of the Hanson County Airport, but he sees little likelihood that his company would contribute in the future.

Delite Industries, also in Hanson Industrial Park and also quite new, uses the airport more often than Gasketco. The manufacturing process for their new line of toys is still not entirely in order, so they experience a constant flow of visitors and technical experts from their parent company in Pittsburgh, in planes owned by that corporation or rented. A company official emphasized that these problems would prove temporary and that therefore Delite Industries does not foresee continuing their use of the airport so frequently.

Recreational Flyers

An engaging variety of persons in Hanson County fly for recreation. Among them is the youngest of the adult Revsons, Martha (Marty) Carison. She takes flying very seriously and has already acquired an instrument license. Her husband had encouraged her to take up the sport, and she soon surpassed him in flying experience and ability. She recounted with some amusement how surprised many male pilots had been to see a woman do so well at flying. She flies frequently and prefers going aloft with friends to flying alone. Despite her enthusiasm for aviation, however, she shares her father's, Judge Revson, conservative views about growth, and is not eager to see the airport expand any further.

Wayne Loomis, a Bennings auto repair shop owner, is a different sort of person--and flyer--in almost every way. One could not imagine the patrician Marty Carison among the piles of papers and auto parts in the shed which Loomis calls his office nor find her impressions of flying in his descriptions of the activity. He regards flyers as a prestigious group, and he feels comfortable being one of them. He has never missed a meeting of the Pilots' Association and he always joins in their volunteer projects. But gregarious as he is on the ground, Loomis prefers to fly alone because, as he termed it, it gives him "a peaceful feeling" and "a better view of the world." As for the county airport, Loomis said he likes Fraser, even though he feels he ignores private flyers to tend to the business firms. Newman, he thought, had been more friendly to recreational pilots. A true flying enthusiast, Loomis has even given some thought to combining his career and his hobby by learning aircraft engine repair.

The president of the Hanson Pilots' Association, Stephen Holtzman, revealed that the Association has thirteen members, but since its inception in 1965 its membership has varied widely: as high as 21 and so low that meetings had been suspended for several months. At the meetings, held once each month at Moe's Restaurant, safety and equipment reports are usually presented and future projects to be undertaken by the Association discussed. Sometimes the meeting features a slide presentation or a guest speaker. Presentations have included slide shows from

flying vacations to Northern Michigan, talks with the county commissioners, and safety talks from members. Stan Fraser is a very active member of the organization but has always chosen to keep his role informal. Holtzman has served as President for the last two years and wants to have someone else run things for a while after his term expires.

Holtzman flies his own plane nearly every week, usually with his family. He likes to fly on weekday evenings for relaxation; on weekends he often takes fairly extensive trips. He holds a regular license only and has no desire for any further training. In fact, he thinks many flyers are "more impressed with the machines than with the feeling of flying."

One local flyer not in the Association is Norman Simens, an insurance agent. Simens is new to Statesburg, having moved there from Indiana. He thinks Statesburg a stuffy and unfriendly place. There are too many cliques, he said, and he proceeded to name and describe the groups he means. One includes the bank manager, GERALD McDUFFY. Simens shares in the ownership of a plane with two other men. He has a few insurance customers out of state, so at tax time he is able to write off most of his flying expenses. Simens is only mildly favorable about the county airport. Though Stan Fraser had taught him to fly, Simens claims he would have learned sometime anyway. "I've been fascinated by flying every since I was a kid, and I was bound to learn some day." The airport is a nice convenience for him, he said, but noted that a lot of the veteran flyers still use the old grass strip in Bennings.

Intrigued by the comments of Delmer, the wealthy citizen who had served as a temporary airport manager, and others about George Hershey, a recreational flyer from another Hanson town, we went there to talk with The owner of a small electronics firm, Hershey is young and well educated (an engineering degree and an MBA), likes small towns, especially Tanner, and loves machines. In the years prior to his current affair with flying, he had built his own boat and his own sports car. He bought a plane in 1972, but after a few months sold it to look for one that was larger, faster, and equipped with more instruments. He is interested in flying

mainly because of its personal challenge and its pleasures. He does have some serious thoughts on some of its social implications, however.

Hershey said he did not know the people in Statesburg very well, although he followed the activities of the Airport Authority. He wants to see more businessmen put on the Authority, because he thinks that the Sunday flyers don't know enough practical management to run the airport properly. He sometimes is frustrated with the seemingly slow pace of developments there. His own firm gave more than two thousand dollars to the airport construction fund, and he regards that as an investment well worth while for both his community image and his business convenience. He flies himself to Houston for business occasionally.

Citizens

On Wednesday morning each week, the county commissioners hold "office hours;" they assemble in the commissioners' room and hear whoever comes to speak to them. Sitting to one side is the county clerk, commanding a set of gigantic gray cloth-bound books containing minutes, regulations, and other vital information.

Ben Travers, the oldest and most senior of the three county commissioners, has served six three-year terms and confidently expects reelection in the next contest. His tenure was in difficulty only once, when in 1962 he was involved in a questionable land deal, but he rode out the storm without much permanent damage to his political strength.

Wayne Boyars, a farmer, is the most conservative and traditional of the three commissioners. A man of little formal education, attired in workman's clothing and with a weathered countenance, he seems at first glance awkward and out of place in an office behind a desk. But his directness, common sense, and self-confidence soon make it evident he thinks the office, and not he, is out of place. His attitude about our project became clear as he asked testily, "What alphabets do you have after your name?" As for the airport, he considered it only a plaything for the "scarf and goggles set."

John Kushel is the young liberal among the commissioners. Forty-four, college educated, and a Humphrey Democrat, he owns a music store. His victory in 1969, in the face of opposition by both the Revsons and the Scotts, was regarded as something of a coup for the town progressives. Kushel favors regional planning, increased emphasis on attracting industry, and more attention to county welfare services. On some issues he and Boyers almost automatically vote against one another, leaving Travers as the pivotal swing man.

All three Commissioners said they are pleased with Stan Fraser; they regard him as the one person who can hold the airport together. They regret openly, however, that his operation requires so much subsidy. The county pays for his insurance, for the maintenance and utilities, and even a very small basic salary. In return they gather in the gasoline sales tax and a \$500 annual rent payment from Fraser. His contract was due for reconsideration in 1974.

Kushel's predecessor, Henry Ward, had strongly opposed the airport, and we tried to get an estimate of how important an issue the airport had been in Ward's close loss to Kushel. Apparently not very. Always a bit of a maverick, Ward was a weak opponent to begin with. His previous two election victories had been by the slimmest of margins. He did not take care to dilute his feisty opinions before they were published. Thus, even those who began by admiring his spunk and integrity sooner or later joined the ranks of the stepped-on. As for the airport, Kushel had not made it an issue, though he was supportive of it in a vague way. He never gave it prominence in his speeches (or, apparently, in his thinking). Ward's opposition to the airport might be said to have been ill-timed, for it occurred just when business usage had begun to pick up, but any speculation that a political upset had in this case resulted from the airport development proved to be unwarranted.

Through Commissioner Travers we were introduced to a man who both participated in the selection of a site for the Hanson County Airport and is a leader in the community's drive for new industry. Jack Freeman helped us immeasurably in putting our impressions and information about the rural scene into perspective.

Freeman had retired from an active career with a major automobile manufacturer. Like many another retired executive he wanted peace and relaxation but couldn't quite reconcile himself to inactivity. Freeman's solution to that problem was to retire to Statesburg (he had lived nearby many years ago) and try to revitalize it without ruining the desirable aspects of its small-town atmosphere. In nine years he has become one of the most respected leaders in the community. This self-assigned task has frustrated Freeman nearly as often as pleasing him. Pounding one fist into the other palm every so often for emphasis, he declared,

"This isn't like a corporation, you know. You don't have the authority to just tell people to do things. Well, you can tell 'em, but the things don't get done. You gotta keep working, and you gotta keep persuading. It takes a helluva lot of time."

One of Freeman's goals has been to stem the flow of young people out of Hanson County. In his view, the only way to do this was to provide more jobs--good jobs, "the kind young people look forward to these days--meaningful jobs." Toward this end he had been on several negotiating teams trying to convince new industries to locate in Hanson.

The present site of the airport is the one Freeman had favored strongly. He had argued that the town's future growth would be in that direction. Of course, the site was advantageous for other reasons as well: It was offered free to the county by its owner, an aging farmer, who had been a pilot in World War I, and, as it was a very flat area, it had significant technical advantages over other sites.

Freeman had not been directly involved in the construction phase of the airport development, so his version of that story was a bit more balanced than what we had heard from the Commissioners and others. Ohio Pavement company, located in Denton, did the grading and paving for the runway, and Hanson Builders put up the terminal building at cost. Since the airport is on low land, drainage problems were expected, but they proved greater than had been expected by either Ohio Pavement or the county engineer, who drew up the original contract specifications. Three months passed while new designs were drawn, and more money was raised.

Meanwhile, Ohio Pavement, the engineer, and the Division of Aviation disagreed publicly about responsibility for the delay.

Freeman gave us a graphic picture of the Airport dedication ceremonies of May, 1967. Freeman recalled both Governor Rhodes and one of the Apollo astronauts put in appearances. Planes rolled down First Street in the parade, hot food was served to the hundreds of spectators, and Director Crabtree emceed while aerial acrobats performed. For the ceremonial proceedings Rhodes made a few remarks about business in Ohio, and Crabtree delivered what for him was a very short speech. He gave thanks liberally to everyone, especially Ohio Pavement, for their "dedication to the good of the county."

The chairman of the Hanson County Airport Authority, Earl Parnell, proved, like Freeman, to be a voluble informant. Parnell is manager of Hanson Square Shopping Center and so has been a well known citizen for years, but his first venture into civic life in an official capacity was to accept appointment to the Airport Authority. He covered a number of key points during the interview. Asked about future developments, he said,

"Well, as always the main problem is money. We want to install a new strobe-light system for the runway, and the runway will need to be repaved in another year or so, and we can never quite keep up with the small maintenance requirements like snow removal and grass cutting, even with the county payments. We need help from the state on these day-to-day things just as much as we did on the construction. You asked about Norm Crabtree a while ago...I think he meant well, but he did sort of drop us after that first big push.

"Fraser? It looks to me like Fraser will do real fine. His operation is still small, but everybody likes him and he works real hard. I know that the people at Winnamaker especially are real pleased with him. He only came to Statesburg four years ago, you know, and we think he's doing real well....

"Sure, some of the farmers, especially the smaller ones, were upset about the idea of an airport because they thought the county should resist development, and they thought that only rich playboys fly airplanes.

But they don't realize how much business relies on aviation. There was only one company that opposed the airport--that was Ramco, strangely enough. Their President stood up at one of the meetings with Crabtree and said he was worried about having more industry come in. He said he liked Statesburg the way it was. I think he meant he didn't want to take a chance on having unions coming in. He's less bothered now because he sees that the changes haven't been that drastic, and his own company has used the airport."

The records of the Airport Authority are kept in the offices of the Planning Commission. The Authority, a group of five flyers and two non-flying businessmen, is appointed by the County Commissioners to oversee for them the detailed operation of the airport. They meet every other Tuesday evening. The minutes of their meetings provided us an insight into the week-by-week operational realities of an airport this size. These items are typical:

"Those present agreed to pay Jack Williams \$25 for snow removal during December per prior agreement with him."

"Fred Loman reported on his trip to the Badger County Airports, where he had inspected their radio beacon and inquired about the costs of installing it. His estimate is that the job could be done here for \$750 and about twenty hours of labor. He asked if the Hanson Pilots' Association might be willing to donate the labor if the county were to put up the \$750. Dr. Ford said he would bring the idea up at the Monday meeting of the Association."

"Dr. Ford then reported on the plans for the September fly-in. Breakfast will be served for about 150 persons, Mr. Crabtree will be the Emcee, and there will be a show of acrobatic flying."

In some counties, newspaper editors had played a key role in promoting the county airport development. Not so in Hanson County. Nor did the editor of the *Hanson Times* have much to say to us about the airport one way or another. He had neither supported the program nor opposed it.

It simply didn't interest him. His most intense concerns have to do with education, and he told us more about Statesburg's educational problems than we really needed to know. (In spite of the airport's lack of salience to the editor, he saw fit to put a short item in the Times that week about us and our mission in the county.) As we searched back copies of the paper for stories about the airport we found only forty pertinent items in ten years' issues of this weekly newspaper. Few though they were, these articles served to supplement and illuminate information gleaned from interviews with community spokesmen. Many of the headlines themselves tell the story:

CHAMBER GROUP PLANS AIRPORT FOR COUNTY
 STATE OFFERS AID TO AIRPORT
 STATE VISIT LEAVES QUESTIONS UNANSWERED
 NONFLYERS BENEFIT FROM COMMUNITY AIRPORT
 POSSIBLE AIRPORT SITE REJECTED
 STATE TO DO SOIL STUDY FOR AIRPORT
 CONSTRUCTION BIDS ASKED FOR AIRPORT
 GOVERNOR, ASTRONAUT TO ATTEND AIRPORT DEDICATION
 COMMISSION NAMES AIRPORT AUTHORITY
 BUSINESS PLANES AT AIRPORT
 FLIGHT CLASS OPENS
 DELMER NAMED AS TEMPORARY AIRPORT MANAGER AFTER NEWMAN DISPUTE
 SKY DIVING SHOW AT THE AIRPORT
 FRASER NAMED NEW AIRPORT MANAGER
 ENGINEERING FIRM HIRED FOR "PHASE II" AT THE AIRPORT
 FLYING VACATION TO NORTH PLANNED
 TWO YOUNGSTERS WIN PLANE RIDE
 FRASER OUTLINES AIRPORT SITUATION TO CHAMBER OF COMMERCE

To read more deeply between the lines of this abbreviated chronology of Hanson County's experience in the Ohio County Airport Program, we interviewed Paul Rosing, President of the local Chamber of Commerce. Unfortunately, that interview did little to fill in the lines of the story, even though Rosing had played a key role in the early history of

the airport. Either by nature or by virtue of his position in the Chamber, Rosing felt obliged to say only positive things about people and events. Hence a rather glowing account emerged, typical of most public-relations minded spokesmen. Somewhat neutralized, it goes as follows:

Some of Statesburg's leaders decided in the early 1960's that a new airport was needed for the county. Rosing and Larry Fontenette, both corporate executives--Rosing with Winnamaker Plastics and Fontenette with Matthews-Harrow Engines--knew that improved airport operations would be beneficial for their companies. Also, they were active flyers themselves and knew several other flyers who wanted an airport in Statesburg. Five men--Fontenette, Rosing, Earl Parnell, and two others--met from time to time to talk about a new airport. They approached the Statesburg Chamber of Commerce with the suggestion, and they were constituted as a committee of the Chamber to proceed with site selection and fund raising. They were in the midst of this process when the Ohio Airport Program was announced. The committee then addressed itself to convincing the County Commissioners to join the program, which goal was accomplished after only several meetings, including a luncheon with Norman Crabtree. Meeting the state's specifications required only minimal changes in their own plans, and the grant was made in 1965. The Hanson County Airport Authority was then established, consisting initially of the men on the original Chamber of Commerce Committee plus two more people.

The progress of the "Hanson County" airport from that point on is recorded above in the comments of its users and local observers. In those comments we have taken care to include reference to any "extraordinary" incidents marking the airport's construction or operation. The paucity of extraordinary consequences was one of the most arresting features of the real findings out of which we constructed the story of Hanson County's airport. Perhaps its coming can best represent an especially quiet and uneventful chapter in technology's continued extension into rural America.

THE REAL COUNTIES

In talking with the people who served as the prototypes of Statesburg's citizens, it became very clear that the county airports were not, even for their rural communities, a particularly large or singular civic effort. County commissioners were at the time variously weighing such things as participation in a multi-county ambulance service plan, a multi-million dollar hospital was under construction; and, in a different vein, large amounts of money had been raised for various charitable projects or special promotional activities. Each of these projects, like the airport, required fund raising, political maneuvering, and official decisions. Each, like the airport, stirred at least some controversy and left some residual tensions in local coalitions and morale. The chain reaction of social effects from *all* community projects and from *all* external stimuli overlap confusedly with the effects of the airport development, making the analytical task vis à vis airport "impact" difficult at best.

Several strong impressions endure in retrospect. Among these is the wide degree of variation in the behavior of community leaders in enlisting their counties in the state airport program. In contrast to the "Hanson County" scenario where enlistment was accounted immediate, almost uncontested, and principally the work of local business leadership, we could have chosen to pattern Hanson's entry into the program after one other county whose airport was considered almost entirely the doing of Norman Crabtree. In that county hardly anyone had so much as thought about airport facilities until the \$100,000 from the state was made available, and even then Crabtree had to put forth great effort to lure the county out of its passivity and into the program.

We did not press hard in interviews for recollections of the role Crabtree had played in getting the counties into the state program, for we were studying them and not Crabtree. Still, on going to them from Columbus we expected him to loom larger in the recollections of rural spokesmen than what they volunteered about him. Our expectations had been too one-sided. That a campaign which seemed intense to the cam-

paigner might be diffused rather thinly among the thousands of his listeners is readily understandable. Moreover, for a county already on its way to building an airport, as some were when the state program entered the picture, Crabtree would seem like only one influence among many.

One of the strongest impressions derived from our study of these Ohio communities was one about which we had no expectations. This is a sense of the airports' positive significance even to people who experienced no direct benefit from them. Some door-to-door interviewing in residential neighborhoods revealed that only a tiny fraction of these rural people had ever flown in any airplane. A larger fraction, but still less than half of them, had been to the county airport or knew someone who used it. Yet almost all these people expressed positive reactions to the presence of the airport.

"A town like this has to keep abreast of the times"

"Reasons? Oh, there are lots of reasons"

"It's important for industry, and for emergencies"

"That airport brought Governor Rhodes to this town"

There was, it seems, a kind of intuitive consensus that the airport enhanced the town's image.

Many preconceptions held prior to actual experience in rural Ohio were modified by what was observed there. Among other ideas, demographic variations came to appear less important, FBO's more important, and economic development unlikely ever to be clearly attached to airport development. The symbolic importance of rural airports loomed larger.

It remains for us to describe the seven actual counties included in this study and visited in this order: Fayette, Jackson, Vinton, Knox, Holmes, Hardin, and Williams. These counties are outlined in heavy relief on the map in Figure 6-1, they will be treated below in alphabetical order. Descriptive statistical data on these seven counties, showing comparisons to the U. S. and Ohio averages where appropriate, are presented in Table 6-1. Table 6-2 gives summary data of the county airport themselves. These data show the kinds of variation mentioned in Chapter Two--variations in site, growth, airport facilities and services, and economic development.

FIGURE 6-1

SEVEN SAMPLE COUNTIES PARTICIPATING IN THE OHIO COUNTY
AIRPORT PROGRAM AND AIRPORT DISPERSION THROUGHOUT THE STATE

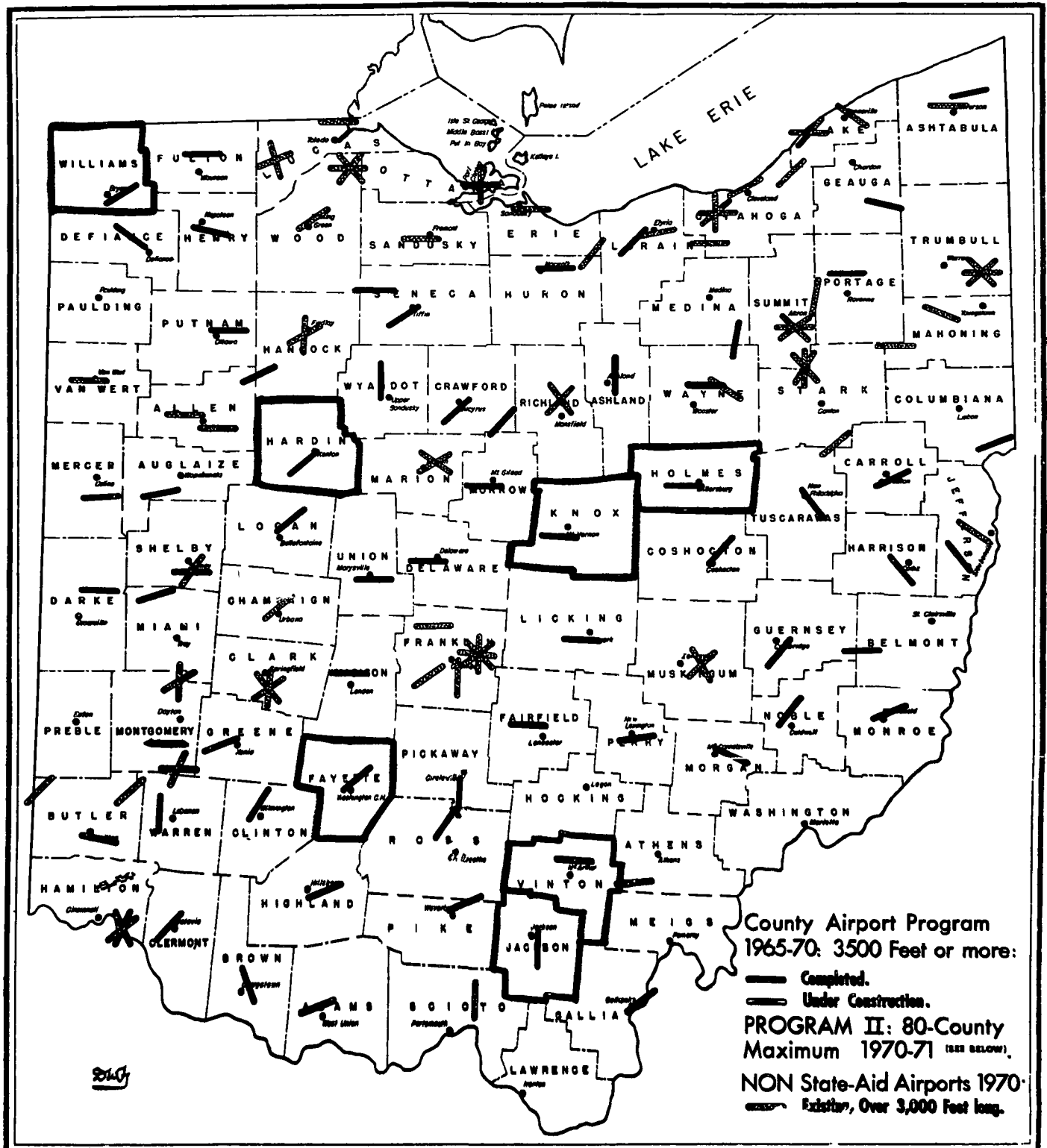


TABLE 6-1: SEVEN COUNTIES: DESCRIPTIVE DATA^a

	<u>Fayette</u>	<u>Hardin</u>	<u>Holmes</u>	<u>Jackson</u>	<u>Knox</u>	<u>Vinton</u>	<u>Williams</u>	<u>Ohio Avg.</u>	<u>U.S. Avg</u>
County population, 1970	25,400	30,800	23,000	27,200	41,800	9,400	33,700	--	--
Principal city population, 1970	12,500	8,300	3,000	6,800	13,400	1,500	7,000	--	--
County population change, %, 1960-1970	2.8	4.0	6.6	-7.5	7.7	-8.3	12.3	9.7	13.3
City population change, %, 1960-1970	0.9	-4.9	-3.9	-2.0	0.7	0.9	-4.8	9.7	13.3
Median years of schooling, 1970 (males)	11.3	12.0	9.0	10.3	12.2	9.6	12.1	12.1	12.1
Percent nonwhite population, 1970	2.95	0.86	0.10	0.83	0.50	0.28	0.18	9.45	12.3
Percent rural, 1970	51.0	56.8	87.0	54.8	67.8	100.0	66.8	24.7	26.5
Per capita income, 1970, (\$1)	2,563	2,500	2,053	2,083	2,743	1,960	2,851	3,221	3,139
Gross county farm revenues, 1969, (\$1,000) ^b	20,800	19,000	15,600	3,327	13,800	1,700	17,900	13,600	14,200
Taxable payroll in county, 1st qtr. 1972 (\$1,000) ^c	8,495	9,504	5,783	7,162	16,854	1,588	22,208	71,973	34,410
Average number of active registered aircraft, 1964-1971 ^d	12	19	8	9	30	1	33	--	--

^aData from 1970 U.S. Census unless otherwise specified.^bData from *City and County Data Book*, 1972^cData from *County Business Patterns*, 1972^dData from U.S.F.A.A., *Census of U.S. Civil Aircraft*

TABLE 6-2

SEVEN COUNTY AIRPORTS: DESCRIPTIVE DATA

COUNTY	FACILITY OR SERVICE ^a	1) Runway Length	2) Load Bearing Capacity (Single wheel)	3) Lights	4) Fuel Grade	5) Notams	6) IFR	7) Unicom	8) Hangars	9) Recreational Park	10) Lessons	11) Charter	12) Repairs
Fayette		4000	30,000	Runway	80/87 100/130	no	no	U-1	one, large	no	yes	yes	yes
Hardin		4200	19,000	Runway; Beacon	80/87 100/130	no	no	U-1	several T-hangars	yes	yes	yes	no
Holmes		3500	14,000	Runway	same	yes	yes	U-1	two, large	no	yes	yes	yes
Jackson		4000	12,500	Runway	same	no	no	U-1	two T- hangars	no	yes	no	yes
Knox		4000	18,000	Runway, Beacon	same	yes	yes	U-1	two, large	yes	yes	yes	yes
Vinton		3800	8,000	Runway	same	no	no	no	none	yes	yes	no	no
Williams		5000	30,000	Runway; Beacon, Strobe	same and jet fuel	yes	yes	no	one large, several T-hangars	no	yes	yes	yes

^aColumns 1 through 7 from U.S.F.A.A., *Airman's Information Manual*, Part 2, March 1973
Columns 8 through 12 from personal notes

Fayette County

"We have come to understand that agriculture is our business. Enthusiasm for development has cooled."

Fayette County, in South Central Ohio, seems to have reached a plateau of sorts--the county has experienced considerable economic development during recent years, but the experience neither reflects nor has caused an appetite for continued growth for its own sake.

Fayette County is primarily and proudly agricultural, earning more agricultural income, and from larger farms, than any of the other counties we visited, even though it is the smallest of the seven in area. Corn, soybeans, hogs, and race horses are among the major agricultural money makers.

The development of Fayette's commerce other than agriculture has included several newly arrived industrial firms, the construction of an industrial park, the construction of two major shopping centers, and the rejuvenation of the downtown area of the county seat with the only setback being the departure in 1971 of a National Cash Register plant. Fayette industry produces mobile homes, steel building products, plastics, work clothing, door windows, bread, and other items. Two of these firms employ more than 200 persons.

Washington Court House, the county seat, is only a few dozen miles from three large cities--Dayton, Columbus, and Cincinnati. Its population makes up nearly half the county's population. Located on what was county farm land just behind a children's home, the Fayette County Airport was the first to be completed under the state development program. It experienced at first a few brief and unsuccessful experiences with airport managers. The manager of a private airstrip in Fayette was employed for a while, but that arrangement was terminated by the county. Then an airport manager in another county bid successfully to lease this one as well, but he moved out before even starting in Fayette. The county then turned to the man who had been the second highest bidder, and this man has served since then, for about eight years. Both businessmen and private flyers have a high regard for him and his operation, Fayette Flying Service. His wife, who occasionally writes a chatty news-

paper column about recent events at the airport, has shared the work at the airport. Her column has had an important effect in developing popular support for and interest in the airport.

The private airport, a sod strip at Sabina, is still preferred by some local recreational flyers.

Hardin County

"Our high school band went to the Olympics..."

Hardin County is one which leaves mixed impressions. It has less than 500 feet of four-lane road, and only one new industrial plant has located there in the last ten years. But Hardin also has built a new library, boasts of a large hospital and a university, and has witnessed repeated expansions of its local industrial plants. It is a county that is short on motels and restaurants but raised \$70,000 to send its high school band to the Munich Olympics in 1972.

Industry in Hardin turns out cabooses, tank trucks, electric switchgear, plastics, and other items. A branch plant of North American-Rockwell makes truck axles, and it is the largest employer in the county (over 600 employees). Rockwell has been very important to the development of the airport. The tank truck company is owned by several local investors, who joined forces to buy the company when it considered leaving Hardin.

Agriculture is important to Hardin County, second only to Fayette among our seven counties in total agricultural income. We met with more farmers in Hardin than in the other counties, and it seemed that they played a larger role in the development of the airport here than elsewhere.

Kenton, the county seat, has about 8,300 people. The next largest town in the county is Ada, to the north, which is the home of Ohio Northern University. Kenton has the county airport. As in Knox and Williams Counties before it, Hardin was already in the process of developing an airport when the state airport program came into existence. Hardin Airport, Inc., a group formed in 1953 to support an airport west of

Kenton, had by the early 1960's begun to look around for a new site. By the time the state money became available, a stretch of abandoned railroad right of way had been purchased for the relocation. A fund raising drive in 1966, especially a \$25,000 contribution from Rockwell, supplemented the state money and helped to complete the land purchase, provide for additional land, and to pay construction costs. The local newspaper was, as in Fayette and Knox, especially supportive of the airport efforts. The county government made no contribution to the fund drive, but it did cooperate fully with the effort. State engineering authorities required a slight shift in the location of the runway, but no major construction problems were encountered. A quarry lake near the airport provides fishing opportunities that attract many non-flyers to the area.

In the early days of the county airport's existence, it was run largely by the flyers themselves, in a semi-formal way, with little or no assistance from the county. Efforts to find a full-time operator were not successful. Six private flyers who owned three planes formed a corporation and made them available for rental or for lessons taught by one of them. Another one of the six acted for a while as informal manager of the airport, but he was and remains a full-time farmer.

Later, the airport authority was more or less revitalized--its membership was given more control of the management. The price of gas was raised, and the profits from its sale to the private corporation went into the public coffers.

Hardin County is replete with two other airports. One is a grass strip in Ada where a parachuting club has been active. The other is a grass strip south of Kenton owned by an agricultural spraying and seeding service.

Holmes County

"You are in the finest county in the United States..."

Holmes County, in the midst of Northeast Ohio, is a quiet, rarefied place. Holmes is a small county, having the second smallest population of

any county in the state. The population of Holmes may be roughly divided into two groups. About one-third of the population is Amish (one of their largest settlements in the nation), and the distinctive Amish way of life adds to the idyllic atmosphere of the place. The rest of the population, although less distinctive culturally than the Amish, seems at once both worldly yet eager to keep Holmes as unworldly as it is.

Although the people are desirous of economic growth, the community leaders seem very careful about what parts of the outside world they decide to let in. The community leaders and the publicity brochures are almost unanimous in describing Holmes' approach to industrial expansion as "selective." One even hears stories of how undesirable industries have been discouraged from coming there. Unions, apparently, are not welcome. The people of Holmes are generally pleased with the signs of rarefaction--for example, the absence of pollution and the absence of any "foreign element" in the population.

Holmes County has known some economic development, of course. One company makes synthetic textiles and films; a new Owens-Illinois plant makes plastic vials; another firm turns out rubber products, still another makes aluminum building products. There is also some production of oil and gas. As for agricultural products, swiss cheese and trail bologna from Holmes are justifiably famous nationwide. Recreational attractions, primarily hunting and fishing, have also been developed--selectively.

Millersburg, the county seat, is smaller than any of the six other county seats except McArthur in Vinton County--it has about 3,000 persons. The small central business district is like that of many another small town, although a quiet town square and the horse-drawn buggies of the Amish add a distinctive touch. In spite of its sense of remoteness, Millersburg is not far from major population centers and major transportation routes. Cleveland is only 65 miles away, and Akron is closer. Three interstate highways pass just outside the county.

There was a municipal airport near Millersburg before the state program came into being. That airport was in many respects unsatisfactory, a particularly important problem was that it was on low land and subject to flooding. Attempts were made to pass a local bond issue for the construction of a new airport, but these efforts fell through.

When the state money became available, five sites were considered. The one chosen was donated by the textile firm located in the county. That firm already had a small sod strip on a hilltop adjacent to the company plant. The county government contributed \$30,000 for the purchase of more adjoining land, and many thousands more were raised through private contributions over several years.

The day-to-day management of airport operations, including rentals, instruction, and fuel sales are conducted by a subsidiary of the textile firm. Part of the hangar, in fact, is used for expanded production facilities, instead of for planes. A one-man charter company, independent of the other operations, has been operating out of the airport since 1972. The charter operation is not a major money-maker, however, and the owner continues his principal occupation as an executive of a local clay company.

Jackson County

"Our antenna back then was a coat hanger.. "

Hilly Jackson County in Southeast Ohio is very much part of Appalachia. It has a history of economic difficulties and has not grown much in population. In the last few decades Jackson has lost many heavy industries--a railroad car works, some steel mills, and some coal mines. These industries paid good wages for skilled labor; they have been replaced by lighter industries that generally do not require skilled labor. The total employment is not down substantially, but the average wage level is.

Although the people of Jackson support the idea of economic development, at least in the sense that they would like to see better industry and better jobs available, they seem little attuned to the organizational ways compatible with such development. There is some obvious development around Jackson--a new shopping center that has attracted shoppers from as far away as West Virginia, a Goodyear plant's arrival (financed by a local "Community Improvement Corporation"), and tentative plans for a new Ramada Inn south of the county seat. But the troubles are just as

evident: a deteriorated central business district, a new food plant that had two false starts by a national corporation before its current (apparently successful) operation, and a high sense of frustration among persons actively trying to get things moving.

The industries in Jackson include Goodyear Aerospace plastics, R. J. Reynolds Foods, Banquet Foods, a metal-working firm, and some clay products companies. The agricultural areas are not, as the data in Table 6-1 show, highly productive of income.

Unlike most of Ohio's counties, Jackson has generally not had good road transportation. The county is hilly, and it is far away from the metropolitan markets of the Northeast. However, the recent completion of the Appalachian Highway has eased the transportation problem considerably.

The county seat, Jackson, has a population of 7,000, out of a county population of 27,000. There are two other towns in the county that, although smaller, vie for prominence with Jackson in many ways. They are Wellston (5,400) and Oak Hill (1,000).

The developments surrounding Jackson's airport seem to have been as troubled as its economy. The airport land is quite low, and problems with the drainage led to huge cost overruns, the blame for which was variously placed. Moreover the donated land does not allow enough room for future expansion. More than half a dozen persons of various backgrounds have attempted, each unsuccessfully, to make the airport operation work. A pilots' association was sustained for a while, a well was dug, an instrumentation link with a larger airport in Kentucky was considered. But none of these efforts has produced lasting results. Still other parties, including a local mechanic and an aviation firm in Kentucky, entered into airport management negotiations with the county that finally proved unsuccessful too.

The County Commissioners are unenthusiastic (at best) about the airport, by reason of their own backgrounds and the excessively high initial costs, which, they say, nearly broke the county. Their desire to have the airport taken off their hands completely is not appealing to potential managers, so the county is stuck with the opposite condition--to support the airport completely, at a cost to the county greater than for any other county in our sample.

In the summer of 1973, the airport situation was as follows. The airport manager was an employee of the county, paid \$5,200 a year for managing the airport from sunup to sundown every day. An English major in college, he had trained as an aircraft mechanic, and he began the job with no capital and little business experience. There is little organized activity surrounding the airport--no airport authority, no major corporate donations or other involvement, no pilots' association. The out-of-town instructor who also works at Vinton County is available on a variable schedule. The county pays insurance and other costs directly.

Knox County

"All-America City, 1966"

Knox County, next door to Holmes, is different from the other six counties in many ways. It is the largest in both area and population. Mount Vernon, the county seat, with a population of 13,000, is just Northeast of Columbus. In 1966 Mount Vernon was named an All-America City by the National League of Cities.

Knox's per capita income is higher than five of the other counties, although still lower than the U.S. average, and it has a smaller percentage of families on poverty incomes than the U.S. average. Its people are above the national average in schooling, and it boasts two well-known colleges. Several major community projects have been undertaken: raising \$2 million for a hospital expansion and \$1 million for a YMCA building, purchasing land for an industrial park, and building the airport (a small project by comparison). All of these developments have taken place in the last fifteen years.

The industries in Knox turn out turbine engines, electronic control systems, foods, mobile homes, and oil and gas. PPG and Weyerhaeuser have plants here also. Four of Knox county's industries employ over 500 people; these stand well above the others in size. An industrial park south of town contains some of the smaller firms. Like the industries we encountered in Jackson and other counties, the industries in Knox have tended increasingly to be ones that employ unskilled labor at low wage rates.

Knox is relatively less dependent on agricultural income than the other six counties, but its agriculture is prosperous. Dairy products, hogs, and corn are among the chief sources of agricultural income, and Knox is notable also as the largest sheep producer of all counties east of the Mississippi River.

Knox county was near completion of an airport, in conjunction with the FAA, when the state program became known. The state money was used, apparently at the state's insistence, to repave and lengthen the runway rather than, as the local citizens wanted, to add buildings. The office and lobby building was erected as a result of a donation from a private citizen who had flown in World War I. The initiative in those early years came primarily from a small group of private citizens, all flyers, and the turbine engine firm located nearby, which has remained an important user and supporter of the airport, they worked together through the Chamber of Commerce. The retrospective view of the county leaders sees the state money as a part of their own ongoing airport program rather than as the source or substance of it.

The Knox County Airport is very close to another, privately owned, airport that had previously served the business firms and private flyers. The facilities were deemed inadequate, however--livestock on the runway being reason enough for that judgment. Once the new airport was completed, the large firm and several private flyers moved their operations to the new airport, although several other flyers remained for various reasons. Some bitterness lingered between the two airport operations, but the current operator of the county airport has been at work trying to generate more cooperation. Directly adjacent to the County airport is a small park and picnic area, built by the Junior Chamber of Commerce.

The Knox County FBO was unusual in our sample, in that he was a native of the town and did not have a previous background in aviation. He had worked for the first operator hired by the county, and when that contract was terminated by mutual agreement he took over as operator. This airport manager clearly approaches the job as a profit making business. He shows some preference for working with corporate customers over working with private flyers and students. That he has generated serious competition for an airfreight company in Columbus suggests the extent of his ambition.

Vinton County

"Now that place was really rural..."

Vinton County, in Southeast Ohio, is the smallest county in the state: it is regarded as 100% rural by census standards. Like Jackson,

its next-door neighbor, Vinton is considered a part of Appalachia. By most urban standards, Vinton seems almost too small to be real. there are no doctors and no Chamber of Commerce, and the County Seat, McArthur, consists of several buildings clustered around one intersection. Vinton has the lowest per capita income and the highest proportion of persons over 65 of any of the seven counties in our sample.

Four industries in Vinton are of major economic importance to the county. An explosives manufacturer, who moved from Cleveland to Vinton several years ago, is now one of the two largest employers in the county. A construction company, which works on major projects throughout Ohio, is the other. Both firms employ over 100 persons. There are also several lumber-related firms and some coal mines. Recently one very large coal mine was activated to help supply a huge new power plant near the Ohio River in Gallipolis. Vinton would like to attract more industry. Vinton agriculture is not strong; the county has the lowest total agricultural revenues of the seven counties we visited.

In the midst of this economic situation, the county airport is apparently healthy and happy. The land on which the airport is built, previously a strip coal mine, was one of three sites offered by the owners, one of whom also owned the construction company awarded the building contract. The donation was made subject to the provision that the filling and reclamation could be paced with the completion of the mining operations. The airport was formally dedicated in October, 1970, later than airport openings in other counties in our sample. A year later the county had completed an administration building and two-story observation tower (the only tower among the airports in our sample) with the aid of state money from the "Phase II" bond issue and some private contributions. The airport seems to have been the only major community project in recent years. The County Commissioners were, we were told, enthusiastic about the entire project. There is no other airport in the county to compete for aviation business.

A manager was hired in 1971, and he has remained the manager since, he seems to have been satisfactory to both the county and the flyers. He is a retired Air Force man, content with the modest income

from his operation and keenly interested in flying. He owns a plane for rental and charter purposes; flight lessons are available through an instructor from nearby Athens.

Just as the Vinton airport is regarded as valuable for attracting industry, recreational use is also heavily emphasized. A large part of the county is in forest land, much of it in a state forest with many campsites. A golf course and park were nearing completion adjacent to the airport.

Williams County

"Flying bums cost you money..."

Williams County, in the very Northwest corner of Ohio, gives the impression of a rather sophisticated and developed place. As in Knox, the people seem organization-minded. A few of the industries there are quite large, a zoning system has been instituted, the airport management appears active and successful, and the town has had a history of public-spirited organization and fund-raising efforts. Williams County's large library system and university campus are visible manifestations of the data in Table 6-1 and other demographic statistics: the high level of schooling and the highest per capita income and lowest amounts of poverty among the seven counties in our sample.

But Williams has its surprises for the visitor impressed with its apparent prosperity. It has the fastest declining city population among the seven cities in our sample, and the biggest deficit of persons 18 to 24. Moreover, impressions obtained in areas outside Bryan the county seat agree more with a rural, undeveloped interpretation of the county.

Williams has a diverse array of industries. Plants in Williams produce toys and housewares, pneumatic machinery, cement mixers, plastics, gliders, and candy. Pet, Inc., and General Tire and Rubber Company also have plants in Williams. Several of these firms employ more than 200 persons; the pneumatic machinery firm is by far the largest.

Transportation seems better here than in the other counties. The Ohio Turnpike passes through, so Williams is on the major route between the Midwestern and the Eastern megalopolitan complexes.

Bryan has a population of 7,000 but seems bigger and more diverse than that figure would indicate. Indeed, the city area takes in about 12,000 people and the extra areas are expected to be annexed in the near future. Both Montpelier and Edgerton are also important foci of activity in the county. Some competition is inevitable in such circumstances, but we gathered that it was less intense than has been the case in Jackson County.

The county airport is the most recent development in a long history of air service in Williams County. Williams was in 1918 one of the principal stops of the fledgling east-west air mail route, and various and sundry airports have been in the county every since. In the early 1960's, the present airport manager enlisted the largest firm in the county and other parties in arrangements for the construction of a 3,500 foot unpaved runway on property he owned. That airport was dedicated in July, 1965. After the state program came into being, he offered his site to the county for its participation in the program--subject to his continuing ownership of all the land except the runway itself and to the county's agreement to maintain the airport. Dedication as the county airport took place in October, 1967.

This man stands almost alone as the initiator, manager, and general guiding force for the airport; none of the other six county airports have been so dominated by one person. On the airport property, he owns and runs two manufacturing firms--the glider company and a plastics concern--as well as Bryan Air Services, Inc., which has charge of the daily operations of the airport itself. This company offers a full range of aviation services, including jet fuel and airplane sales. Unfortunately, some tension has been experienced between Bryan Air Services' few employees and their employer.

The situation at Williams is unusual also in that the airport seems to be the least "public" of the seven. Signs along the approach to the airport give the impression that authorization is required for an approach; the manager discourages private recreational flyers through high fees for tie-downs and through personally discouraging informal socializing among flyers and employees at the airport. His main interests

are his own companies and his major corporate flying customers. Two large companies have planes based at the airport.

Located very near Williams County airport are two other airports: the Woodruff strip, a privately owned airport near Montpelier, and the Bryan-Defiance airport, built in the 1950's to serve the two named communities. Conversations about these two airports with people who use them revealed some resentment toward the new airport, coupled with a grudging recognition of its physical superiority as an aviation facility.

Such was the outer empirical strata of seven communities which had received airports under the Ohio County Airport Program. Further excavation for the effects accompanying these new technical facilities took us to their user communities. The two following chapters recount, respectively, the results of our probe of business and recreational aviation activities at these county airports.

CHAPTER SEVEN

CORPORATE USES OF AIR TRANSPORT IN RURAL OHIO *

Small rural airports, typified by those constructed in the Ohio County Airport Program, provide a quite specialized transportation capacity. It is a capacity which holds out to communities the promise of economic development and seems to be a private pilot's spring board to the outside world. In this chapter our attention is fastened upon the uses corporations made of the air transport capacity the new airports brought to our sample communities. These uses and imagined benefits feed the local boosters' dreams of increased economic vigor and make up a good deal of the rationale for the public support of aviation development. To what uses were these airports put and to what consequence?

Answers to these questions proved more subtle than one might expect. To begin to develop such answers we first conceive of a transportation system most generally as a source or point of origin, a destination, and a capability for physically linking one point in space to the other. The source and destination each has its own local population, land use patterns, and supply and demand for products and services. When a person travels to visit friends or family he is mainly concerned with the social aspects of his destination. If, instead, he is taking a vacation to the mountains, the land use attribute of his destination is of primary significance to him. To continue this analogy, transportation systems carry goods as well as people goods are moved from place to place as supplies are distributed to locations where they are in demand. In our advanced industrial society, where services comprise a growing fraction of our gross national product, matching the supply of any single service, such as health care or plumbing repair, with its local demand is likely to require an appropriate transportation capability. In general, then, transportation involves a transfer from one place to another of certain combinations of skills, equipment, information, or unmet needs.

*Major contribution from Stephen R Rosenthal

These examples of transportation uses are familiar parts of everyday life, so familiar that we often take such transportation capability for granted. Our personal space comes to be defined in part by the ready, low cost access we have to much of our urban and rural environment. Yet for a new transportation activity to be established, the value of that transport function must somehow exceed or equal its cost. Such costs should take account of the time needed to complete the transportation process as well as other charges for fuel, costs of the vehicles, etc. Accounting for time costs--a standard consideration in the fields of investment analysis, location theory, and decision theory--can alter cost/benefit comparisons among available transportation alternatives. But our intention is not to evaluate the various transportation options for solving a particular logistical problem. Rather it is to understand ways in which a single transport option--the existence of a rural county airport--can be useful to a wide variety of local corporate operations. To do so, we need to refine the concept of transportation outlined thus far.

The "user" can be seen in our case as a corporation rather than a single individual. As such many of the transportation functions that might be valuable to an individual will seem "irrelevant" in the corporate setting, for example, "getting away from it all," seeking the "adventure of travel" and new personal experiences in travelling to different culture. In the world of corporate transportation the local qualities of the "source" and "destination" become translated into dimension of economic well-being. Thus, supply and demand considerations can be seen in each of the corporate operations--production, supply and distribution, marketing, and management. Production activities, for example, require that certain equipment be in full operating condition. The supply department, in turn, must ensure that an adequate array of raw materials and components are available at a manufacturing facility. The corporation's distribution system delivers finished products to customers. Marketing people are continually in search of new customers and the protection of continuing relationships with existing customers. Corporate management, in a firm

with geographically dispersed facilities, requires that suitable channels of communication and control be established with all corporate facilities for routine performance evaluation, as well as for rapid response to emergency situations. It would be in the service of these sorts of business needs that corporations might use rural county airports. Thus, for our study in Ohio, the key research questions were: What conditions seemed to prompt corporate use of air transport? Are there conditions in which the value of a small county airport is distinct from that of the other transportation options available to corporations in these rural communities?

Several subsidiary questions guided our research. What kinds of corporations use Ohio's county airports and what corporate functions are thereby served? To what extent did the county airport program lead to the location of new or expanded corporate facilities in rural Ohio? More generally, how are rural Ohio communities affected, even indirectly, by such non-scheduled corporate aviation activities? And, finally, what are the central issues of public policy which emerge from this appreciation of the nature of corporate usage of the county airports? In short, we sought evidence of the economic, political, and social impacts which might be associated with the new non-scheduled aviation capability as used by local corporate entities in our rural counties.

The literature on corporate aviation is extensive and ranges from rather specialized trade journals to several popular magazines.¹ Although this literature typically tends to dramatize the potential value to corporations of air transport capability, it nevertheless provides a pragmatic understanding of the major operational, organizational, and financial aspects of corporate aviation usage. While these sources often provide both anecdotal or statistical data they do not include data particularly appropriate to the research questions raised here. Therefore, in our field research, a much more direct and systematic exploration of the functional implications of non-scheduled aviation capability was necessary. In addition to the day-to-day, functional implications, the potential effects of this new transportation capability on the major decisions of plant location and expansion were central to our project. If

new plant location and expansion had in fact occurred, then the less direct social and political influences on the community deriving from any such expansion or change in employees would become important.

It is well known that corporate decisions to locate a new plant in a rural area are based on several major factors besides those related to transportation--e.g. availability and cost of labor, land and utilities, as well as local tax rates.² In addition there are many transportation-related considerations that affect such plant location decisions: access by highway, rail and air transport to other parts of the same corporation, to major suppliers, customers, and more generally to centers of commerce. Encompassing these many factors, plant location decisions are quite complex. Thus it seemed clear, even before visiting our counties, that the availability of a local airport without scheduled flights service would not be likely to be the single major factor in corporate decisions to locate plants in rural Ohio. Accordingly, research objectives were formulated in terms of a "null hypothesis": that is, that the presence of a recently constructed airport would have *no effect at all* on corporate decisions to locate in or to expand existing facilities in rural Ohio. Then in our corporate interviews at recently-located plants, we were intent on discovering any evidence that would shed doubt on this "hypothesis." This strategy emphasized a search for smaller effects as well as more substantial ones on the plant location decisions and also provided the opportunity to explore other impacts of the county airport program upon company operations.

Selecting corporations which might be using county airports proved to be somewhat tricky. Existing literature provides little firm basis for predicting which corporate facilities will tend to be significant users of non-scheduled aviation. Certain practical considerations thus affected the sample of corporations that were included: only those corporations or firms in the seven county sample were candidates for selection. Within those counties all "user" corporations were sought. But even after arriving in one of the rural communities, since there was no single record of airport use, it was difficult to determine which corporations used the airport. Furthermore, local opinions as to the most

active users often differed from those of state-level officials. Fortunately, it was possible to contact *all* those corporations which were even *rumored* to have used the airport at some time.³

For each corporation contacted, an attempt was made to probe as deeply as possible for the meaning the local county airport held for that particular firm. Interviews were held with those company employees who had direct involvement with the corporation's use of these airport facilities and services. A brief questionnaire was developed to guide these corporation interviews.⁴ In these discussions the interviewer first learned enough about the organization, operations, and practices of these firms to appreciate the specific context of the corporation's actual airport use. Questions concerning how such corporate activities would have been (or actually were) conducted without the availability of the local county airport were also included. Since the respondent was typically a well-informed corporate executive or operations manager, the interview style was open-ended. The interviewer probed for the required information in a variable sequence and pattern, depending on the respondent's ability to describe the context and significance of airport usage as well as the extent and variation of a particular corporation's uses. Interviews lasted from a minimum of twenty minutes to a maximum of about an hour. Detailed information was gathered on each company's structure, operations, and local history. Most of that information provided the needed background to appreciate the rationale for the company's use of their local county airport, or lack of it. Subsequent to completing our field research, extensive telephone interviews were conducted with the corporate flight operations managers of six of the companies who flew into our airports but had planes based elsewhere. Those interviews attempted to establish a sufficient appreciation for a corporation's overall flying activities so that our data on local aviation requirements at a single rurally located point could be understood within a broader context.

Some salient characteristics of this corporation sample follow. Each of the fifty corporations visited had facilities in one of five rural communities in Ohio.⁵ They varied in size from family owned, single plant local firms to branches of some of the largest corporations in the United

States, and ranged in size from several plants with 50 employees or less to four with over 500 employees, with most firms falling in the 100 to 250 employee range. (One third of the local companies are branches of corporations on *Fortune's* list of the largest 500 firms in the country.) Three "corporate" aviation users were self-employed individuals (a geologist, an insurance salesman, and a land developer.) Products manufactured by the corporations covered a wide range of the manufacturing industries well represented in Ohio-- including automobile equipment, mobile homes, building supplies, heavy machinery, plastics/petrochemicals, light metal products, food processing, and electronics. These firms also varied by type of airport usage some corporate users owned their own planes, others used local charter services, and some did both. The complete distribution of our sample by size and industry follows in Table 7-1.

TABLE 7-1

SAMPLE FIRMS USING OHIO COUNTY AIRPORTS

Industry Affiliation of local facility	Number of employees at local facility					Total	Users ^a
	1-25	26-100	100-250	250	500 over 500		
Auto Equipment	---	---	3	1	1	5	(5)
Mobile Homes	1	3	3	---	---	7	(6)
Building Supplies	2	2	2	1	1	8	(6)
Heavy Machinery	1	1	1	---	1	5	(4)
Light Metal Products	1	1	1	---	---	3	(3)
Electronics	---	1	---	1		2	(2)
Food	---	---	1	1	---	2	(2)
Plastics/ Petrochemicals	---	---	2	2	---	4	(3)
Other Manufacturing	---	2	2	---	1	5	(4)
Services/ Institutions	6	2	1	---	---	9	(7)
Total (Users) ^a	11 (10)	12 (10)	17 (14)	6 (4)	4 (4)	50	(42)

^a"Users" is taken to mean firms who had some direct occasions to use their county airport or who intended to do so in the near future. Included are firms whose usage is either quite infrequent (only once a year, say) or non-existent.

CORPORATE AIR TRANSPORT·
CONDITIONS OF LIKELY USE AND SERVICES PROVIDED

The form of our original question about corporate airport use--what kinds of corporations use Ohio's rural airports and what are the major services provided to them?--proved to be rooted in an unwarranted assumption that there are a relatively few specific types of corporations which are more susceptible than others to the use of air transport. But the possible uses of aviation are so varied that most corporations were, in some minimal sense, either a user or a potential user. A more useful form of the question is *What characteristics of a firm would make it unlikely to be a user of the county airports?* As it turned out a typical non-user would be a one-plant firm producing finished products for a local or regional market which receives its supplies locally, and whose manufacturing process does not include any complex hard-to-repair machinery. In other words, most manufacturers *are* potential users of county airports having appropriate services. Witness indirectly to this potential, almost all corporations, regardless of their past experience with air transport, felt that the county airport should exist and should be supported by the community. One crucial condition of use is, of course, the level of capabilities that exist at the airport.

What service capabilities then, were offered to local corporations? An initial understanding of these capabilities helps in appreciating how individual firms used the airports to their own advantages. The various airport services are outlined below in terms of increasingly sophisticated activities and facilities. They begin to connect the notions of "airport capacity" and "corporate usage": the more of these following capabilities that are present, the more corporations are likely to see benefit in the use of air transport.

Landing facility for visiting business planes--At minimum the county airport provides a landing site for visiting business planes. Such planes are owned variously by corporations having local plants, by their customers, or by their suppliers. These planes may even be chartered by any of these organizations. In such cases, the physical facility at the airport provides the "minimum level of service" to the local corporate

community. The availability of fuel at the airport is a helpful but not always necessary additional attraction.

Home base for corporate planes--If a corporation in rural Ohio owns a plane it may be based at a local county airport, most likely in a company-owned hangar. In this situation, some airport services including fuel and maintenance are a necessary part of support "capability" in addition to the existence of a serviceable landing strip.

Charter service to special destinations--In many "emergency" business situations corporations turn to aviation as a partial solution and depend on the county airport for charter service to remote locations. This use of the county airport assumes the *immediate availability* of a qualified Fixed Base Operator (FBO) who has an adequate fleet of planes and backup pilots in addition to the existence of the physical airport facility. In some locations this service may be informally provided by a local flyer as a personal favor or as a secondary form of income. In one extreme case a company had certain operational emergencies each of which required rapid delivery of a special piece of freight nearly 2,000 miles to a customer in distress. The FBO at the county airport was asked to fly to the nearest major airport in his own plane, get on a scheduled flight with the parcel, rent a plane on the other end of the flight, fly to the customer's remote location, hand deliver the parcel to him and then return home in the same manner. Thus, the local county airport in Ohio was one component of a more general aviation capability that was available to a rural firm.

Taxi connections to nearby major airports--Several companies in one of our counties used the county airport primarily for the ongoing air taxi service that was offered by the local FBO. This FBO provided regular flights twice daily to and from a major city airport 30 miles away. This service was used primarily to deliver special orders of one company's light, small finished product to the scheduled air freight operation at the nearby major airport. In addition, this taxi service (occasionally provided by FBO's in some of our other counties, as well) took travelling company executives and their visitors to and from their scheduled flights at that other airport. In these cases, the aviation

capability included the continuing reliable taxi service of the FBO in addition to the county airport itself.

Corporate Uses of Ohio's County Airports

How did corporations use the air transport services available at the county airports? Uses varied quite widely, although they could be ordered systematically in terms of the typology shown in Figure 7-2. This typology distinguishes between the movement of freight and of people and between movement directed toward the rural plant or away from it.

FIGURE 7-2

TPOLOGY OF CORPORATE USAGE OF NON-SCHEDULED AVIATION

DIRECTION OF MOVEMENT	TYPE OF OBJECT TRANSPORTED	
	<u>Movement of Freight</u>	<u>Movement of People</u>
Brought In to Airport	I. a. Supplies for repairing broken machinery	III. a. Sales visits by customers
	b. Supply of needed raw material	b. Problem solving by non-local technical experts
	c. Supply of needed product component	c. Executive visits
	d. Broken product returned for repair	
Moved Out from Airport	II. a. Repair parts for customers' machinery	IV. a. Sales visits to customers
	b. Raw materials or components needed by customers	b. Remote problem solving by local technical experts
	c. Sample products or blueprints for customer approval	c. Executive trips
	d. Products enroute to scheduled air freight	

The great variety of uses made of air transport is illustrated below by examples of the many actual uses we discovered. Each situation occurred only rarely, but some interesting patterns emerged when all the instances noted by our corporations were reviewed. This empirically derived typology contains a number of uses not reported in the popular literature as well as all those that are.⁶ Linking the elements of this typology to the more general corporate functions of production, supply, distribution, marketing, and management shows that the movement of freight and people are often coordinated. When a corporation which manufactures machinery, for example, is called on to fix a customer's broken product, there may be a need to transport both a repair part and a repairman out from its own facility (to that of the customer) and then back again.

1. Bringing Freight In

An industrial plant requires a constant influx of physical resources including raw materials, product components and equipment. The economics of such goods movements usually dictates the use of relatively low cost bulk ground transportation, either truck or rail. Air transport is limited to situations which are characterized by unusual circumstances, ones severe enough to be called "emergencies."

A. Supplies for repairing broken production machinery

- A manufacturing plant employing 600 people prefabricates steel buildings. When one of their large production machines, such as an automatic welder, breaks down, a production shut-down or back-up occurs, resulting in extremely high costs to the company. As often as once each month this problem occurred with sufficient suddenness and severity that the maintenance manager arranged with the fixed base operator at the local county airport for a charter flight to bring in a replacement component from the equipment manufacturer several hundred miles away.
- The plant manager of a small, 30 employee hand tool forging company occasionally needed a similar charter flight when a hammer part broke and production was halted until the spare part could be acquired.
- Occasionally a rural Ohio daily newspaper was threatened by a sudden breakdown of its press machinery. Two or three times each year such a breakdown occurred finding the publisher without the needed

replacement part. Faced with the danger of not getting the day's paper out, he would charter a flight to get the part from another of his publishing plants or from his equipment supplier.

B. Supply of needed raw material

- ° About once a month, while in the middle of a large production run of a single order, a major cellophane packaging manufacturer would find himself without an adequate supply of certain "wet goods," raw materials such as primers, thinners, resins, and inks. It was very costly to stop production of the order requiring the specific material, process another order, and then change back to the initial order when more of the needed "wet goods" were acquired. Charter flights to the "wet goods" supplier often avoided these production change-over costs. (This class of flammable goods are "red labelled" by Federal statute and cannot be carried on scheduled aircraft which combine passengers with freight. Thus charter flights are especially attractive for this purpose.)
- ° The same company occasionally needed similar charter service when there was a "rush" customer order which required immediate start up and the needed "wet goods" were not in stock. This happened recently, prior to Halloween, when a major customer ordered, on short notice, a larger delivery of special holiday packages. To meet the holiday deadline the plant manager had to acquire needed raw materials by using a special charter flight from the local county airport. This avoided a missed deadline and lost profits.

C. Supply of needed product component

- ° A large mobile home plant would charter a flight from its local county airport for an emergency supply of small components, such as faucets, moldings, or drapes when it was caught short of such an item. These components must all be on the mobile home before it could be shipped to a dealer. Such delayed shipments form a backlog in this firm's delivery schedule, since its own fixed fleet of trailer trucks were being used to full capacity. Relieving backlogs in delivery of mobile homes necessitated the high cost of specially rented trucks, and would incur costs greatly in excess of those for a plane charter.

A charter flight could easily eliminate a potential backlog by bringing in a number of the depleted components and thus maintaining the planned production schedule. In this case charter flights were extremely cost effective.

D. Broken product returned for repairs

- ° A major manufacturer of large power engines used by the oil and gas industry occasionally is called upon to make an emergency repair of one of its products. If the repair problem is severe enough the engine manufacturer may insist that part of the engine be returned to the plant in Ohio for repair, instead of sending a service man to the customer site. In one such incident a broken engine was flown from Alaska to the Ohio county airport in the customer's corporate jet. The jet waited overnight while the engine was being repaired and then was used to return the engine to the offshore drilling operation in Alaska. The savings in avoiding drilling "down-time" greatly exceeded the costs of this emergency flight activity.

2. Moving Freight Out

A primary requirement of industrial activity is the shipment of goods from producers to their customers. A rural manufacturer, almost by definition, is subject to extensive and costly distribution requirements to gain competitive access to national markets largely in urban areas. In times of "emergency," when a customer requires the best delivery terms available, a rural manufacturer may turn to non-scheduled air transport if it is available. This situation can occur in a variety of ways depending on the relationship between the manufacturer's product and services and the particular requirements of his customers.

A. Repair parts for customers' machinery

- ° A manufacturer of metal gaskets and related products serves a national market of major auto manufacturers, refineries, etc. About six times a month this firm is called upon to deliver an order for the repair of their customers' machinery. Since these situations are typically emergencies from the viewpoint of the customers, air freight is used, drawing on the services of the Fixed Base Operator at the local county airport.

B. Raw material or components needed by customers

- ° A large producer of plastic seat cushions and backs for automobile seats supplies the major automobile manufacturers at many of their assembly plants. Each year when the auto manufacturers change over to their new models, demand for this firm's products would surge as, typically, their customers decided to accelerate their own production schedules. This increase in volume often required that air charter shipments be made using the local county airport. Such need for air freight also occurred when there was an in-transit delay of a crucial shipped order or a manufacturing breakdown at the rural plant. Because this company serves a relatively small number of large customers who employ an assembly line technology, it was crucial to satisfy customer's needs. The loss incurred by a customer who is "shut down" because of running out of a single component must be avoided if at all possible.
- ° The cellophane packaging manufacturer mentioned earlier occasionally sent a customer a partial shipment by plane. This happened when simultaneously the manufacturer was behind on his promised delivery schedule and the customer was low on his available supply of that particular type of package. The customer could not afford to delay his own deliveries for lack of packaging for his product.

C. Sample products or blueprints for customer approval

- ° A large packaging manufacturer prepares "test rolls" that are samples of what their finished product will look like. They often air ship these test rolls, or related preparatory art work, to the customer via a charter flight to expedite the pre-production approval process.
- ° A small firm of 30 employees makes switch gear and controls for gas turbine engines serving the major manufacturers in that industry. They often used air freight to get drawings to these customers for rapid approval.

D. Products en route to scheduled air freight

- ° Several firms used scheduled air freight as a standard component of their product distribution system. In one of our Ohio counties

the Fixed Base Operator supplied an air taxi service from the local county airport to the major city airport about thirty miles away. Companies of all types found it useful and economical to have this FBO pick up these shipments at their plants, fly them to the major airport and arrange for scheduled air freight connections to their ultimate destination. This situation is more likely to be a corporation's "standard operating procedure" in contrast to the case-by-case nature of the situations discussed above.

3. Bringing People In

Modern industrial enterprise is characterized by a wide range of specialized technical and management activities as well as by decentralized operations. Though a firm may place a plant in a rural location and provide it with adequate local labor, management and production capabilities, such a plant cannot operate independently from access by "outsiders." Representatives of customer organizations as well as various members of the rural plant's other corporate offices will have occasion to visit the plant. Often such a visit will be more efficient if the trip is made by air. In fact many plant visits are likely to be considered "infeasible" were it not for the existence of a local airport.

A. Sales visits by customers

- ° A mobile home manufacturer with a very modern plant periodically arranged for some of its largest customers to fly to the local county airport to visit the manufacturer's production facilities for the day. This was done in order to acquaint these dealers more fully with technical aspects of their own product or to show them the manufacturer's new product line. The use of aviation rather than other modes of transport makes such sales visits convenient enough so that the customer is likely to accept invitations which they would otherwise decline.
- ° A large company that makes molded plastics often brought potential new customers, major manufacturers of consumer products, to their plant for specially arranged day trips using the plane owned by their parent corporation.

B. Problem-solving by non-local technical experts

- Some large decentralized corporations periodically bring accounting experts from the head office to a rural Ohio plant to audit its books. If the company owns a plane it may schedule these visits via the county airport. The flexibility and convenience of such auditing activities makes it possible to retain some measure of centralized accounting and control in an otherwise decentralized corporation.
- Major customers of local manufacturing companies may send their own quality control inspectors to visit the facilities of their suppliers. In Ohio several companies reported having such visits from their automobile-manufacturing customers, frequently via the local county airport.
- A large corporation opening a new type of food processing plant in rural Ohio sent its own quality control engineers to attend to start-up problems. They arrived at and left from the local county airport on the company jet.
- A plant that makes reinforced fiberglass components is often visited by a customer's technical experts to review preliminary drawings of a new product's tooling stage: the objective is either to approve the design or to revise it before full scale production begins.

C. Executive visits

- A branch of a major east coast corporation was occasionally visited by headquarters executives when non-routine personnel, financial, or technical problems arose. These executives arrived at the airport of a nearby city in Ohio using their own corporate jet if it was available, otherwise, they used scheduled flights.
- A national food processor opened a unique special-purpose plant. Many executives from other locations in the corporation visited this plant to inspect the new processing facilities. Such visits were typically arranged for groups of executives using the company jet and landing at the local county airport.

4. Taking People Out

In our advanced industrial society where communication over long distances has increasing importance, transportation often serves that

function. Even faced with the relatively high cost of transport, many corporate executives and specialists, particularly those who are sales-oriented, believe that a telephone call cannot be an adequate substitute for face-to-face contact. For a rurally located firm, travel time can be particularly prohibitive, especially if the destination of one's trip is also outside a metropolitan area. Thus, by cutting down the time needed to travel, non-scheduled aviation can offer great savings, often making it possible to conduct face-to-face business when a telephone substitute will not do.

A. Sales visits to customers

- Sales people based at a rural Ohio manufacturing plant used the local county airport for departing on routine sales calls or delivery of samples to customers.
- When special sales opportunities arose--such as a new customer contract or an industry show--several of the corporations arranged special charter flights from their local county airport.
- A rapidly growing manufacturer in the building supplies industry plans heavy use of a company-owned plane for sales trips to develop an expanded marketing area.
- Several manufacturers of large pieces of oil drilling construction equipment used chartered air service to take their own salesmen and prospective customers to another remote location where their product could be seen functioning in the field.
- An insurance salesman expanded his territory by flying his own plane to communities beyond convenient automobile range to visit with potential clients.

B. Remote problem-solving by local technical experts

- When a printing press broke down at a rural publishing location away from his headquarters, a publisher who is based near a rural county airport would occasionally charter a flight to send his best repairman to fix the problem. This did not happen often, but when it did, such charter air service was well justified in order to get the day's paper issued. Once a local pressman had to be sent this way when the only pressman at the other location suffered a major accident in the process of publication.

- Some large equipment manufacturers provided a similar repair service to their widespread customers on an emergency-response basis. This service usually required air transportation for the repairman who is an employee of the local Ohio firm.
- On the special occasion of a major industry show, a foreman of a mobile home manufacturing plant in rural Ohio was sent via charter air flight to the location of that show in order to assemble the company's exhibit. The plant could not afford to be without its key foreman any longer than necessary.
- A geologist flies over remote locations to assess from the air the likely payoff of various excavation sites. This unusual use of aviation clearly has no competition from available ground transportation.

C. Executive trips

- Executives of several companies with central offices in rural Ohio flew to other field offices of their companies, using either company planes or charter flights, in order to resolve management problems as they arose.
- Certain executives of several plants in rural Ohio visited customers of suppliers if special circumstances seem to make such trips advisable. If their destination was not easily serviced by scheduled airlines they would charter a flight from their local county airport.
- An entrepreneurial land developer frequently flew his own plane over a thousand miles to inspect new sites or to review progress on current development activities.

Corporate usage of non-scheduled aviation, in summary, serves a wide variety of functions in support of corporate business operations. Some of the firms in our sample illustrated the fairly frequent use of air transport to move freight or people about. For most firms, however, these activities were very limited in scope and quite infrequent. And some firms had not used the airport at all. The rest of this chapter attempts to put these corporate activities into a more systematic perspective--first, by reflecting on structural determinants of airtransport use which are internal to the corporations themselves, then, by identifying some exogenous factors affecting county airport usage.

EMERGENT ANALYTIC CONCEPTS
VARIABLES DETERMINING CORPORATE DEMAND FOR LOCAL AIRPORTS

It is difficult to abstract from the various findings presented earlier a single model of the impact of non-scheduled aviation capability on rural corporate activities. Simply too many distinctions emerge in examining our rich data base. In a sense, we know too much about our problem to summarize it with a neat system of several causal equations. Rather than present a model which suffers from forced closure, it is more appropriate--in this murky middle ground of partial empirical awareness--simply to identify the analytic variables which emerge as leading indicators of corporate demand for non-scheduled aviation. Our claim then is that these emergent variables present a realistic basis for understanding the complexity of the particular technology assessment problem addressed in this study. Furthermore, this list is unusual for its hybrid quality, it encompasses considerations which span the separate fields of transportation economics, operations research, and business management including marketing, finance, and organizational psychology. While each of the variables may be obvious to certain groups of scholars and practitioners, it is unlikely that all of the variables, constructed as they were from a synthesized viewpoint, could have been developed before the field research had been performed.

The device of a list of variables is, furthermore, quite intentional. For any single firm, these variables interact in some particular pattern to define contextually that firm's likely demand for non-scheduled air transportation. Due to the many combinations through which these variables may interact, however, the notion of a single decision model for such aviation demand is clearly unmanageable. A variable list, then, becomes a useful heuristic device for introducing this complex phenomenon.

In the case of the Ohio County Airport Program, for example, the "measurement" of each of these variables, for a given corporate situation, would be a first step in the projection of likely corporate usage of the local county airports. Any such projection must, however, also consider the exogenous factors described in a subsequent section, for example, the

trade-off between aviation and other modes of transport is particularly important and needs to be examined further for individual cases. A more detailed discussion of exogenous factors follows the immediate examination of corporative characteristics.

The variables to be discussed in this section have been drawn from our survey findings. The above functional presentation of airport usage can take on more predictive qualities, we hope, by combination with the following more business-oriented categories of variables:

Corporate Style and Image: Extent of "aviation orientation" of the corporation, management style of particular corporate executives; and corporate need to express community support.

Demand and Logistics: Size and weight of the product; customer's usage of the product; structure of supply and distribution systems; and seasonality of product demand.

Management Control and Information: Inventory control policy and procedures; corporate financial management and accounting, and technical uniqueness of a manufacturing process.

The sequence of discussion does not reflect any priority of ranking of these variables. Instead it was chosen to facilitate a linear exposition of the highly complex system of corporate enterprise--a system so complex that it is difficult to predict the usage of non-scheduled aviation for any particular corporation at any particular time. Moreover, it is clear that such usage will vary over time as the identified variables, as well as the overall economy, take on new configurations.

Corporate Style and Image

Many corporate actions, including transportation, depend as much on the style and image favored by management as on the more calculable costs and benefits of those actions. The importance of corporate style and image in explaining a corporation's usage of their local airport is traceable to factors that may be historical, environmental or idio-

syncratic and tended to be quite independent of other aspects of the corporation's business.

Extent of "aviation-orientation" of the corporation. For many of the companies surveyed a major underlying reason for their extensive use of non-scheduled air services is that they are "air-oriented" corporations. Though this concept is not treated in the literature, an air-oriented corporation is characterized by the indicators listed below. Some indicators are probably more directly significant than others, but we have made no attempt to determine their relative importance here.

- Extensive corporate aircraft ownership: number and type of planes: supporting "aviation division" staff and budget, history of company-owned planes for executive transport,
- Involvement of the company with the aviation industry either as a plane manufacturer or a manufacturer of plane components such as tires or control systems,
- Personal exposure of chief executives to aviation through military service, or recreational flying,
- Extensive decentralization of company operations and travel demands on management;
- Relative level of innovation in the corporation and technological sophistication of its industry.

Management style of particular corporate executives. "Executive style," while difficult to define analytically, nevertheless, emerged strongly from our data as a significant though idiosyncratic factor in determining non-scheduled aviation usage by rural industrial plants. Executive style was an important determining factor when other conditions favorable to plane usage were present, such as a dispersed distribution system. The presence of an FBO with an entrepreneurial style can also be of overriding import, for he presents an opportunity that an aggressive executive style can take up even when the corporation is not "aviation oriented."

Executive style emerged most importantly when an emergency or special opportunity arose and the chief executive at the plant decided,

often contrary to normal company (and general business) practice, to make an extraordinary use of non-scheduled air capacity. Occasionally an action-oriented executive, for example, would decide that either he or one of his key employees should fly immediately to the scene of an emerging problem or major sales opportunity. Such a sudden visit to a supplier or customer or to another location of his own corporation was viewed by the executive as more effective than either the more conventional and indirect approach of telephone communication or the hope that the problem can be handled in more routine fashion. We met several such executives and became convinced that it was their personal style of leadership--not their company's policy or their position in it--that primarily accounted for several significant uses of county airport facilities. In one instance, a plant manager admitted that his numerous decisions to use the charter flight service at the county airport directly conflicted with his corporation's headquarter's policy against such action.

Corporate need to express community support. Thus far this chapter has concentrated on the direct economic aspects of corporate decisions to use non-scheduled aviation at rural county airports. Airport usage has been viewed in terms of readily identified instrumental corporate functions for which airtransport yielded economic or managerial efficiencies. It is also important to mention one other factor--a symbolic gesture toward community support--that is much more difficult to pinpoint though it clearly was responsible for some company use of local airports.

The county airport is a public facility. It is supported through public funds. To be viable as an active airport, its FBO must have sufficient business to make a modest profit. If a local plant which is prominent in the community chooses neither to support the airport through its contributions nor to use the airport services and instead uses other transportation services at a roughly comparable cost, that firm may needlessly develop a somewhat negative community image. To some extent there may even be informal pressure on many firms to demonstrate their support of such a public venture. They can do so by making more use of the airport than would be justified solely on grounds of internal cost efficiencies.

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Demand and Logistics

Product distribution, the vital corporate activity which links supply with demand, is the most obvious transportation requirement to be met by any viable industrial organization. Decisions concerning which transportation mode--truck, rail, plane, etc.--ought to be used for product distribution receive serious attention and analysis by modern corporate enterprises. Our survey identified a series of characteristics of product, customer, and normal distribution patterns which combine to affect the relative attractiveness of non-scheduled air transportation for freight purposes.

Size and weight of the product. The size and weight of a corporation's finished product clearly affects the feasibility of using air freight for its distribution.⁷ It is, of course, rather obvious that one cannot use air transport for products that are either too large to fit into a plane or too heavy to make the aviation mode economically viable in comparison with truck, rail or shipping alternatives. The question of economic viability, however, as already mentioned, is affected by the "emergency" nature of the shipment.

Customer's usage of the product. In this regard one of the most interesting and elusive variables emerging from this portion of the survey concerns the character of the local firm's customers. It was often the customer and his use of the product that determined whether a rural manufacturer needed to have a nearby non-scheduled aviation capability. This factor often turned out to be more significant than the obvious issue of the size and weight of the product itself. Frequently, huge *indirect* costs could be incurred under conditions of inadequate air-transport capability! Consider the situation of a *customer* having to close down his own production facility due to the unavailability or breakdown of a product made in rural Ohio by one of the corporations in our sample. In an instance reported above, seat cushions were occasionally flown from rural Ohio to an automobile assembly plant in another state to avoid an impending shortage. Were it not for those emergency air shipments the customer's assembly line could be shut down for some time at an incredibly high hourly cost. Since this customer very likely

provided a significant portion of the local Ohio firm's business, it was important for the supplier to reduce the risk of such a possible disaster by developing the practice of using emergency air charter service whenever such a need developed. This practice held even when the shortage was clearly the fault of the customer, due for example, to a last minute change to increase the customer's rate of production of a particular automobile. In such cases the customer usually paid for the special charter flight. Clearly, the potential shortage cost to the auto manufacturer could quickly become a real cost to the local firm if its large customer took his business elsewhere to have better emergency responsiveness.

Another instance of this type occurred when the product was an essential part of a customer's own production capability. The case of the large engine air freighted in from Alaska to a rural county airport as already described is illustrative. When the engine broke down, suddenly it cost the *customer* so much in lost production and sales for each *hour* of down time that any transportation cost to speed the repair would be negligible by comparison. The complicating factor in this case was that the only feasible way to fix this particular engine was to return it to the plant in rural Ohio where it had been constructed. Transport cost for this 6,000 miles round trip were quite high but had an aviation capability been unavailable the resulting cost would have been much greater.

Structure of supply and distribution systems. Goods movement in the United States has always relied heavily upon a system of highways, rail and water traffic. Non-scheduled aviation generally offers poor competition with truck, rail, shipping and even scheduled air-freight for most ongoing corporate supply and distribution needs. It is primarily *during an emergency*, however, that these basic transportation systems turn out to be inferior to a specially chartered air trip to fetch needed supplies or persons or to deliver a crucial order of finished products. Such emergencies may be caused by non-transportation factors such as changed production schedules or equipment failure, either at the rural corporate plant of interest or at one of its customers' locations. Breakdowns or delays of the normal supply and

distribution system may have similar effects. As the reliability of traditional transport systems decreases, due, for example, to labor strikes, fuel shortages, or scheduling difficulties, the value of the air charter option for freight movement increases. In such situations air charter operations can be seen as an *emergency back-up* to other modes of supply and distribution.

Seasonality of Product Demand. A rural plant manufacturing products with a highly seasonal demand introduces a special case deserving mention. In the peak season two situations already addressed above are likely to exist simultaneously: greatly increased customer need for the product, and a strain on the normal supply and distribution system for the product. The convergence of these two factors generates a dramatically rapid rise in the value of peak season charter air freight service from the rural manufacturing plant to major customers. Such demand for charter flights is more predictable than are other emergency events and can be anticipated to some extent by the local FBO who is likely to be called on to provide this transportation service.

Management Control and Information

The final set of variables involves a number of those procedures and operating processes which are integral to all business activity. Though not directly related to product distribution patterns, these procedures and processes often prompt special transportation requirements which can be satisfied through the use of local airports. Inventory control actions, for example, may affect product delivery requirements, while financial and manufacturing considerations have implications for the movement of people in and out of a rural industrial facility. And information gathering, even simple communication activities, sometimes has transportation analogues, especially using the flexible, fast mode of aviation.

Inventory control policy and procedures. Maintaining inventories of raw materials, spare parts for key equipment, product components or finished products provides a buffer against emergency run-outs. For the

corporations in our survey much of the need for non-scheduled emergency freight movement stemmed from insufficient inventories of critical products or components. These problems are likely due to many factors including shortage of storage space, inadequate ordering procedures, timeliness of shipments, and the seasonality of demand, most of which were discussed above. For each type of inventory problem, "delivery time" of the inventoried item--the time it takes to order and receive the item--is a critical aspect of the problem, the shorter the delivery time, the less "safety stock"--inventory for emergency use--needs to be kept on hand for a particular item. Thus an emergency charter flight service nearby to pick up or deliver a crucial freight item--thereby reducing delivery time--is a facilitating factor in the inventory maintenance system. Of course, the lack of this non-scheduled aviation capability could conceivably be compensated for by a corresponding increase in the local inventory maintained for an item. Certainly our survey disclosed some situations in which keeping such an additional buffer inventory would be infeasible or impractical. Yet for most of the situations described in our data, it was very likely that modifications in inventory control policy and procedures could have rendered unnecessary many of the emergency freight charter flights.

Corporate financial management and accounting. It was clear from our interviews that the type of financial management and accounting systems adopted by the corporation had a significant effect on corporate attitude toward airtransport, depending on whether it had "tight" financial control or "loose" controls. No attempt is made here to further refine these concepts. However, the implications of the differences in "style" for the use of a rural airport can be seen when considering the corporation that owns the planes it uses and the corporation that does not.

If a company not owning a plane exercised tight financial control on its expenses, it tended to limit the use of special charter flights by requiring special advance justification and approvals for such actions. Under looser financial controls such a firm allowed local managers much more discretion as to whether or not a charter flight

appeared worthwhile. On the other hand, a company owning its own plane and exercising tight financial controls encouraged high utilization for the plane so as to spread the fixed cost over more trips. Many non-essential trips to rural plants using the company plane might then occur, since all trips regardless of their purposes, improve the plane's utilization. Under less stringent financial controls, visits to rural plants via the company plane depended mostly on the occasions that arose for such visits and the relative attractiveness of various modes of transportation. Of course, other factors described above simultaneously influence corporate usage of rural airports, so the effect of this financial factor is conditional on these other dimensions. Corporate financial management considerations, for example, probably do not exert the major force on a decision as to whether a corporation owns its own plane; our brief survey of corporate aviation divisions suggests that the "air orientation" of a company is likely to be a more significant factor in that regard.

Technical uniqueness of manufacturing process. One of the important reasons that visitors came to rural plants is the technical uniqueness of its activities. Since such a plant would be "out-of-the-way," air travel is one option for getting there. Several cases of this situation existed for our corporations. Visitors ranged from engineers and other technical personnel who were sent from corporate headquarters to correct problems in the manufacturing process, and company executives from other locations who came to see the new plant, to major customers who wanted to observe and understand the new technology behind the product they might buy. The common thread of these cases was not the particular product, its production technology, or the type of visitors. Instead it was simply that something unique was happening at the rural plant and that a variety of people who would normally not visit a remotely located manufacturing process all had special reasons to make the trip. Many of these trips were to solve operational "start-up" or subsequent quality control difficulties. Other trips were essentially for site or facilities visits by high level executives from corporate headquarters or by its special customers. In these situations plane

arrivals are likely to be more frequent at these plants than in more ordinary business situations.

All of the factors of corporate style and image, demand and logistics, and management control and information can be isolated in a survey such as ours. Yet in practice they work together, within the interrelated processes of a single industrial facility, to shape the particular outcome which interested us: the use made by a corporation of its local airport. A technology assessment effort requires this sensitivity in identifying the components of such decisions. However, it should also retain a broader view, one which accommodates more synthetic observations. For any technological implementation of scale this requires some analysis and reflection on the special "exogenous" factors surrounding the case under study. We turn now to these considerations.

PARAMETERS AT THE STATE AND COUNTY LEVEL SOME EXOGENOUS FACTORS

An appreciation of the many corporate uses of non-scheduled aviation and of the different meanings of local aviation capability was necessary initial steps in evaluating the impact of county airports on industrial activity in rural Ohio. Also necessary was a determination of the conditions under which these county airports provide a particularly valued technological capability. These factors, exogenous to any single corporation, emerged as the most important "external" factors in shaping the corporate uses of Ohio's county airports. They were the role of the Fixed Base Operator, access to alternative airports, and the availability of suitable non-air transportation.

The Role of the FBO

The activities of a Fixed Base Operator determined much of the value to corporations of the Ohio county airports. As described in Chapter Four, each airport built in the Ohio County Airport Program was

required to have a manager recommended by the county commissioners and at least informally "approved" by the State Division of Aviation. In some of our counties, the manager existed in title only, he spent time at the airport but did not really manage anything. In other counties the manager functioned as a fixed base operator (FBO), an entrepreneur owning his own planes and offering flight instruction and charter flight services to the community.

The typology of corporate usage of non-scheduled aviation (see Figure 7-2) suggests that an active FBO is virtually a prerequisite for the county airport to serve most corporate needs. Consider the following facts derived from our corporate interviews:

- (1) Many corporations did not own their own planes. Less than 40% of those companies interviewed had purchased aircraft, and our sample was intentionally biased to include only those firms which were likely to be air-oriented.
- (2) Corporations that did own planes were not likely to base them near rural plants. Only six business planes were based at the seven Ohio county airports that were surveyed. In each case the owner corporation had its headquarters at that location in Ohio. A large firm with a plant in rural Ohio was likely to have plants in other locations. Since its main headquarters was often quite distant from any particular rural plant, access to the company plane by a local plant would naturally be quite limited.

In many cases, then, if a local plant in rural Ohio had a need for air service but did not have a company plane, the only airport readily accessible was the county one. Thus if a particular plant wanted air-transport for any of the uses listed in Figure 7-2 it would have to rely on the local FBO, unless (1) the supplier/customer involved had a plane and provided it for the plant's use, or (2) there was an FBO at an airport near a required destination who would fly into the rural Ohio airport and then return to his home base. Clearly the local Ohio firm

would have the most reliable service when it could count on using the proven services of a nearby FBO rather than choosing to use either of these two other options. Even when the local plant was part of a corporation that had its own company planes based at an airport other than the county airport, it was often cheaper and more effective to use a local FBO rather than to count on ready access to a remote company plane. Whether an Ohio county airport had much value to a local rural plant was, therefore, closely dependent on the reliability of the FBO at that airport in maintaining facilities and provide charter services.

Arranging and providing emergency charter flights can be a large part of the business of the Fixed Base Operator at an airport. It was clear that the FBO's entrepreneurial skill and resources to a large extent influenced how extensive the airport's charter service would be. The FBO in large part creates a market for his services rather than responds to a well-defined situation. He is an entrepreneur who can increase his charter business by demonstrating its potential value to local businessmen. If a local plant is part of an "air-oriented" corporation, then it may very well seek out the FBO's services and even offer him suggestions on how to be more responsive to its needs. But in most cases, a latent market for charter flights exists which will be developed only by an aggressive, business-like FBO.⁸

The proximity to other Ohio airports. Ohio was moderately well endowed with airports even before the county airport program was established. And after the primary development phase of that program, the State was richly endowed with them. Thus many of our local county airports were likely to be in moderately direct competition with other airports. The problem seemed to plague some rural FBO's and was due in part to the following conditions:

- (1) Most of the counties in Ohio are within about an hour's drive of a major airport either in Ohio or an adjoining state. Thus scheduled air travel is a convenient option if one's destination is near another major airport.

- (2) Almost all of Ohio's rural areas have a medium-sized "regional" airport, such as the Lima and Findlay airports, within 40 miles. The regional

airports predate the recent county airports and continue to offer some scheduled flights and active FBO operations. Better landing conditions with higher visibility, longer runways, and/or instrument landing capacity often existed at a regional or metropolitan airport. Often the pilot of a corporate plane would elect to use one of these larger airports even though it was farther from the local plant.

(3) Most aviation-oriented companies interviewed claimed that had their county airport never been built, they would use one of these other airports without enduring unacceptable inconveniences; still, these companies generally felt that the county airports were of some value to them.

The near saturation of Ohio's rural areas with airports tended to limit the intrinsic value of any single local airport. While an aviation capability might be very important to a firm, a somewhat less comprehensive airport construction program would probably not have noticeably affected a firm's air transport usage.

Alternative modes of transport. Ohio's considerable highway, railroad and river transportation capacities provide direct commercial access to widespread suppliers and markets. And since the state is small and generally flat, air transport is often an unnecessary luxury for intra-state trips. Many companies that were interviewed noted that the attractiveness of other transportation modes in Ohio left them with little need for an aviation capability. The county airports therefore often have severe competition from other transport modes in this highly accessible transportation network throughout Ohio and neighboring states.

These three exogenous factors become important when attempting to address general questions about rural corporations and non-scheduled aviation usage. In understanding the relative significance of the FBO, other nearby airports, and other transportation options, one begins to see that a technology assessment effort must carefully choose its field research opportunities. Inevitably, impact evaluations become limited by the available data base. In our case, the Ohio context included these several special attributes which call for caution in extending our findings beyond their natural setting.

Conclusion

This survey of the ways corporations use non-scheduled aviation was an exploratory probe into relatively uncharted research areas. Not surprisingly our findings must remain inconclusive; the sample was quite small and the insights which emerged do not fit a neat, easily summarized pattern. In attempting to establish a pattern it was necessary to find a way of ordering the various functions airports may provide for corporations. In doing so, we established some of the functional pre-requisites which are necessary for corporate use and, hence, corporate effect on community life. Then from the data collected in the interviews, a typology of use was developed, one which we argued is much more refined than others available and reveals a great variety of uses. These are largely "emergency" or special purpose situations, in which time delays contribute either to the financial costs of production, to reduced control and coordination, or to reduced customer confidence.

Characteristics associated with likely use by a corporation of a community airport were also derived from the data. These included aspects of corporate or management style, demand and logistics considerations, and internal management policies. These factors in combination with the pre-requisites of corporate use of an airport could become the basis for community decisions about the kinds of corporations that might be persuaded--by promoting the airport as a major feature of the community--to build or expand locally. Finally, the factors external both to the particular community and to the local corporation were reviewed in an attempt to identify some of the elements which shape the likely use of a particular airport. Perhaps the most important single finding in all this is that the airport manager, the FBO, has a crucial role in converting the physical facilities of an airstrip into a vital operational airport contributing to local community development.

In this chapter thus far we have explored the relationships surrounding a corporation's potential use of airtransport made possible

by the establishment of a local county airport. But several of our original questions have remained unaddressed. We turn to them now. To what extent did the County Airport Program lead to the location of new or expanded corporate facilities in rural Ohio? How are rural Ohio communities affected, even indirectly, by such non-scheduled corporate aviation activities? To these we add a third: What are the central issues of public policy which emerge from our perspective of corporate usage of the county airports? To appreciate our findings on these matters, recall that for all of the corporations that were contacted there were reports either that they had used the airport facilities at one time or another or that they were interested in or supportive of the airport. Therefore, local firms not contacted were unlikely to have been aviation oriented.

In order to address the matter of plant location each of the corporations in the survey that had located in our communities *after* the beginning of the county airport construction was asked whether it preferred its new location to others because of the availability of the county airport. Not one of the executives answered affirmatively. At best, several said they considered the existence of the airport to be a favorable, but secondary factor. Most of these local executives, even if they used the airport occasionally, conclusively stated that the airport was not a significant part of their plant location decision.⁹

In short, the Ohio County Airport Program did not exert a notable influence on recent industrial location decisions in the counties surveyed. While this may not have been the case for all other communities in rural Ohio where plants had been located or expanded, it was difficult to conclude that the existence of a county airport was a major factor in such decisions, although in several cases the existence of the airport seemed to be taken into account in the decisions. Thus on the basis of this field study we are inclined to accept the "null hypotheses" that the presence of a recently constructed airport would have little effect on corporate decisions to locate in or to expand existing facilities in quite rural portions of Ohio.

This portion of the study does, however, offer strong evidence in favor of a *different* argument: that large corporations that were *already* located in rural Ohio before the airport program began frequently exerted a significant influence toward bringing the new airport to their county. Some of these firms already had corporate planes based at these rural locations, others had corporate planes which occasionally brought visitors to these rural plants. In general they all tended to contribute funds for construction of the local airport. In some cases their executives worked actively to promote community support for the airport. Often such supportive firms were doing well in their rural location. Some had significantly expanded their facilities since originally locating there. Others anticipated such expansion in the near future. Typically, these firms saw the county airport as a useful transportation option which, for one reason or another, helped to make that rural location a viable base for *continued* corporate investment. None, however, insisted that they would have avoided plant expansion had the local airport not existed.

How does corporate use of county airports affect the rural communities in which such airports are located? Our data cannot support a conclusion that the county airports were a major factor in causing firms to locate new plants in rural Ohio. It is also hard to demonstrate that the growth of any of these local plants would have been significantly less had there not been a county airport. Without such changes, therefore, very little direct economic, social or political impacts on these communities would be likely. The local pool of executives, some of whom were community leaders was not much changed. Nor did airport usage have much of an effect on a local firm's community image. The most dramatic indicator of community impact was an indirect one corporate use of the county airport seemed to symbolize a significantly attractive feature of these communities as they compared themselves to other rural towns. All but one of the local Chambers of Commerce in our seven counties advertised the airport in their publications, and it was frequently featured in most local newspapers. Results from an informal door-to-door survey tended to reflect a sense of community pride in local airports.

Indirectly, then, as a symbol of the town's modernity, corporate usage of the county airports may have stimulated local pride in these communities--pride similar to that related to their other public facilities--hospitals, parks, libraries, and schools.¹⁰

What public policy issues are raised by such corporate use of rural county airports? The fact that there was so little evidence that the construction of the county airports affected the economic development of rural Ohio raises an interesting policy issue. To what extent should government initiate the public financing of a facility which apparently has highly uncertain direct demand and even more uncertain indirect impact on the economic and social life of the community? What public service was being provided when the state allocated \$150,000 for "3,500 feet of county road," a "road" which is not used by very many of the local citizens? At first blush, one might conclude that the matter was much in doubt and therefore the whole county airport program should be viewed skeptically as the product of bureaucratic politics. But adopting a more comprehensive view of the public good, one can see the Ohio County Airport "system" as a *latent* capacity for the state. Most manufacturers appear to be potential occasional users of the county airports. As long as a rurally located plant either has affiliated offices or does business beyond a comfortable driving distance, that corporation is likely occasionally to experience one or more of the situations which prompt the use of aviation we described above. To the extent that a county airport provides a latent capacity for such uses whenever they might be needed, it functions as a sort of insurance policy. From this perspective, it can be argued that it is a public function to provide such standby facilities to local industry much as police and fire protection is provided on an as-needed basis. The question remains, however, how much public moneys are justified for this service. Clearly, as discussed in Chapter Four above, the FAA has one answer to that and Ohio's Division of Aviation another.

Perhaps the most interesting conclusion of this survey is that our particular methodological perspective has taken us a long way further into the briars and brambles of technology assessment than now exists

in this field. In a sense, we have arrived at a new beginning. We can now ask questions that never even occurred to us at the early phases of this research. How does one avoid the elusive distinction between the "convenience" and "necessity" of a new technological capability like rural non-scheduled corporate aviation? When is need for emergency transportation a symptom of another corporate operating problem rather than a signal that more accessible air transport is required? What is the value of a redundant, back-up transportation capability? As corporate enterprises are becoming increasingly interdependent, the boundaries between groups of interacting corporations continue to blur. Moreover, public initiative and corporate response form even more complex social, economic, and political relationships. Technology assessment must begin to acknowledge these complexities and probe deeper than the deceptive outer cloaks of causal impacts.

NOTES

¹Periodicals which cover developments in corporate aviation include: *Aviation Week and Space Technology*, *Business and Commercial Aviation*, *Business Week*, *Business Management*, *Business Horizons*, and *Fortune*. Articles in these sources range from very general introductory presentations to special purpose information updates. See "Corporate Aviation--The Businessman's Happiest Burden," *Business Week* (September, 1969). ("Time is the fourth dimension; the company plane the invader. Miles become minutes, the prospect is a sale. The impossible is simple. Are you ready for it? Where do you begin...?" For a less typical and less optimistic case see Warren J. Alverson in "The Shakey Case for the Company Jet," *Business Horizons* (April, 1972). ("The business airplane is not a sure-fire profit maker. In fact, it is generally a money loser...Unless properly managed from the beginning, corporate aviation may turn out to be a time waster instead of a time save.") Favorite topics covered in articles on corporate aviation deal in the formation and management of a corporate Division of Aviation, methods of financing and costing aircraft, insurance options, changes in government regulations, and technical specifications of new planes. For an example of the more typical superficial and clearly biased articles that tend to claim universal benefits from corporate aviation, see "The Future 1,000 Corporations--The More they Fly, the Richer they Get," *Business and Commercial Aviation* (November, 1972): ("No matter how you read the statistics, the operators of corporate aircraft are far out ahead.")

²See for example, David M. Smith, *Industrial Location* (New York: Wiley, 1971); Gerald Karaska and David Bramhall, Eds., *Locational Analysis for Manufacturing* (Cambridge: MIT Press, 1969); and Benjamin Stevens and Carolyn Brackett, *Industrial Location: A Review and Annotated Bibliography of Theoretical, Empirical, and Case Studies* (Regional Science Research Institute, Philadelphia, 1967).

³But even these guides proved deceptive; some of the firms contacted had in fact never used the airport.

⁴See questionnaire in Appendix

⁵Interviews in Williams and Vinton counties included local officials and citizens but no corporations.

⁶For example the value of non-scheduled aviation in aiding salesmen to see more customers and increase sales is illustrated in a "case study" article, "Business Soars for Flying Salesman," *Business and Commercial Aviation* (January, 1974). *The 1968 Management Guide to Business Aviation* presents a series of "travel profile" articles showing some corporate uses made of single engine and twin engine aircraft.

⁷Air freight may utilize either direct charter flight from the production site to a customer's location or indirect shipment using a scheduled air-freight operation and a taxi flight from the local county airport to the nearest major airport.

⁸See Chapter Five for a more extended discussion of the importance of the FBO.

⁹In two cases special inquiries had to be made with the company executives (now located elsewhere) who had been the first plant managers and who could authoritatively respond to this issue.

¹⁰The difference between symbolic and operational significance is illustrated by the discrepancies between public impressions of corporate aviation activity and its actual levels of use. Although contrary to public perception, many of the companies turned out upon investigation to have had very infrequent contact with their county airport.

CHAPTER EIGHT

RECREATIONAL FLYING IN RURAL OHIO*

This chapter concerns the recreational uses of airtransport capacities. It focuses on a number of recreational flyers whose aviation activities were based at county airports built under the auspices of the Ohio County Airport Program. These flyers make up one of the groups who benefited directly from the Program.

Recreational flyers differ from commercial or corporate users of aviation capacity in that they fly mainly as an end in itself. They fly for personal enjoyment, not simply because flight serves the single primary function of flexible, high speed transportation. Flying is part of their lifestyle, but just as aviation represents many things to corporate users, so, as we shall see, it means many things to recreational flyers.

To study the activities, attitudes, and perceptions of this group can contribute to a sense of the impact which the new airports have had on rural communities in Ohio. Thus we have been concerned to increase our sensitivity to the character of the milieu which exerts a primary influence upon members of the community who take up flying and through whom a local airport's effects are channeled to the community at large by studying the character of recreational flying, the qualities of the people who engage in it, the uses to which they put it, and the meanings it holds for them. To some extent this chapter is a limited ethnography of rural Ohio's recreational flyers. It should be seen as a brief examination of a portion of a subculture subject to certain necessary external prerequisites and having its own internal social relationships and symbolic meanings.

We first discuss prerequisites of recreational flying, then shift to an analysis of recreational aviation activities in rural Ohio. An

* Major contributions from Edith Levine and Stephen Rosenthal

exploration of the various personal, social, business and family meanings related to flying then follows. The chapter concludes with specific attention to the functions served by the county airports as the centers of rural flying subculture in Ohio and to the associated indirect impacts on community life.

Several informal hypotheses guided this phase of our field research. One line of thought was that the county airports, by providing an appropriate facility, would serve as a locus of vital social and recreational activity for a group of local residents and that this activity would indirectly influence the flyers' perceptions of themselves and broaden their perspectives of the world around them. Furthermore, one might expect that a rural community would tend to confer stature on its group of active flyers (and airport supporters), with a resulting increase in that group's social mobility and local leadership potential. Finally, it seemed likely that recreational flying by rural citizens might be limited to an increased awareness by their community of the outside world.

To examine the fit of these probabilities to the Ohio case, recreational flyers in five of the seven counties covered in this study were interviewed. This cross section included men and women, old and young, those who owned planes and those who rented them, those who could easily afford to fly and those for whom it was a struggle. In all, 37 people were interviewed. The sample of rural Ohio flyers is almost random, but because of its small size, we cannot be sure of its representativeness. Since no systematic differences among counties were found, all the respondents are combined into a single sample for our analysis. Interviews, lasting from 20 minutes to an hour, were non-directive and based on an open-ended questionnaire included in the Appendix to this study. Interview data was supplemented by information about "fly-ins" (gatherings of flyers at sponsoring airports), review of various popular flying magazines and newsletters, and inquiries concerning licensing requirements and Veterans Administration reimbursement for flight training.

The interviews attempted to establish some notion of respondents' respective economic situations and occupations, levels of participation in community affairs, whether their orientation was toward rural or urban

lifestyles, where they had previously lived, where and with whom their business was conducted, their "ideological" positions--progressive or traditional--on local issues, their leisure time activities in addition to flying, and the general breadth of his or her social world. Less definable factors such as style of dress, home furnishings, and speech were also noted. In order to organize quite disparate information, an index was developed to reflect each flyer's probable overall "sophistication" as reflected in his or her view and uses of aviation. This composite "Socioeconomic-Rural/Urban" (SER) index attempts to reflect in a single dimension some important sociological components of "sophistication" (See the appendix, pages 370ff, for a detailed description). Four categories were developed along this dimension,¹ however, two initially distinguished "lower" categories have been collapsed into one, so that subsequent analysis reported here in the tables which follow was based on three groupings--HI, MID, LO--of approximately equal size--12 to 13 members.²

Our findings are presented in two forms. Quasi-statistical interpretations are offered where appropriate. But since a sufficiently large sample to ensure representativeness could not be interviewed, statistical inference is not attempted. Only where the relevant data is quite convincing are hypotheses identified and summary statistical displays presented--and then only as indicators of a potentially fruitful area for more fruitful research. Where such presentation of quantitative data is not appropriate, more qualitative data is offered to help convey the richness of meaning recreational flying has for its participants. Both types of data, hopefully, will be of interest to future researchers and to persons involved in policy making.

Prerequisites for Recreational Flying

Unlike many other types of recreational activity, flying makes strict demands on participants. Time and money, sometimes large sums, must be spent, training must be sought, licenses earned, airplanes rented or purchased, and finally, airports must be available. Before

much recreational flying can be done, these requirements must be satisfied. The sport requires substantial investment and is likely to become a significant part of a participant's life

To acquire the skill and coordination necessary to maneuver an airplane requires a considerable amount of *training*. Navigation is especially important the student flyer must learn how to use flight instruments and maps and to master complex trigonometrical calculations. The ability to react correctly under pressure, especially in unusual circumstances, is crucial. Much of a pilot's training consists of in-flight drills and considerable reading and discussion in preparation for myriad potential emergency conditions. Once licensed to fly, he must continue to learn--security in the air comes only after much experience, and a pilot is well aware that his skills must be kept up. The incorrect interpretation of an instrument reading or a hesitant response to a warning signal can spell disaster. Such mistakes, as it is said, are "not habit forming "

An obvious associated requirement is *free time*. The basic 20 hours of flight needed for a private license is accumulated at a slow 1/2 to 1 hour per day, and few people can afford to fly more than once or twice a week. Although only 20 flight hours are required for the FAA's lowest level of private pilot license, most beginning students spend considerably more time practicing in order to assure themselves of their own competency. Time is required to arrange for rental planes as well as to prepare and file flight plans. Additional time is spent in formal or informal ground school training, often requiring aspiring pilots to relearn rusty high school mathematics and plumb the mysteries of charts and maps. For many this is the first "forced" learning experience they have had in years, and it becomes an intensely personal experience.

Once the requisite flight time has been accrued, the aspiring pilot must meet stringent *FAA licensing requirements* in order to qualify for the first level private pilot's license, which permits non-commercial, non-instrument dependent flying in a single engine plane. The FAA maintains rather strict control over the quality of private pilots by requiring extensive flight tests and written examinations, as well as

periodic physical examinations. The more advanced license levels require considerable additional training and testing. These licenses permit various specialized aviation activities: the instrument rating licenses instrument-dependent flying, the commercial rating licenses sale of charter services, and an instructor's rating permits the licensee to give lessons. There are also special licenses necessary for operating various types of planes--twin engine craft, sea planes, and jets. A third (12) of the flyers interviewed were working *toward* their private licenses, and almost half (17) had earned *only* their private licenses. The remaining 22 percent (8) included two flyers who had earned instrument ratings and six who were much more advanced, holding a total of seventeen licenses among them beyond the private license level.

While ten (or 60%) of those holding private licenses wanted to get instrument ratings eventually, only three of them were actually in training to do so. The main advantage of an instrument rating is to be able to travel in all sorts of weather--a requisite for long trips, when plans require quick refueling stops regardless of weather conditions. A minority of students and pilots holding private licenses did not intend to study for instrument ratings. The course leading to this rating is perceived to be very difficult, requiring much time and effort. Continued practice is necessary to maintain adequate levels of competency. Furthermore, many pilots felt that flight totally dependent on instruments and without ground reference was not very attractive.

Perhaps the most formidable obstacle for the would-be pilot is finding the necessary funds to pay for instruction and plane rental. Often people wait until they feel sufficiently well established before spending \$15 to \$20 per hour for flying recreation. Typically, planes adequate for training rent for about \$15 an hour, and one hour rental may yield only thirty minutes of actual logged flying time. If, instead of renting a plane, the recreational flyer chooses to buy one, he must pay anywhere from \$1,500 for a small, minimally equipped plane to \$15,000 or more for a large, single engine craft. Instructors' fees, generally \$8.00 to \$10.00 per hour, inflate the cost of learning to fly at the outset. Though students are required to have a minimum of only ten

hours of actual flight instruction before they may be cleared for solo flight, they often need over twenty hours before they feel confident enough to attempt it. Additional expenses are encountered in the course of ground school training--for fuel, maps, books, and accessories. It costs the average student between \$800 to \$1,000 to get a private license, it can often cost much more. Once licensed, it will cost him up to \$1,200 to get an instrument rating. Training, of course, accounts for only a portion of the flyer's expenses, to continue flying afterwards, he must still buy or rent a plane. Although most of our respondents had sufficient funds to support occasional flying, almost all of them felt that flying was to some degree a financial indulgence. It is no trivial matter to spend \$15 for an hour of fun in the air.

Several types of financial arrangements helped to keep these flying enthusiasts airborne. Almost a third of our respondents, most of whom were self-employed or partners in small businesses, could deduct some portion of their flying expenses from their income taxes. At one local airport with no fixed base operator to offer rental planes, a group of seven people formed a corporation and bought three planes which they rented "at cost" to themselves and at a small profit to others. Even though the venture was not making the handsome profit for which they had hoped, these owner-renters had low cost access to better planes than most of them could have otherwise afforded. Some flyers selected popular model used planes which appreciate in value and which they can resell. Plane ownership thus becomes both an investment and a cost-reducing ploy.

Various other strategies were used. Three student flyers occasionally worked at the airport helping out with radio controls or maintenance to help pay for their lessons. Two others who were licensed instructors gave lessons, one as his main source of livelihood, the other to subsidize his own flying. Several pilots offered informal charter services and plane rentals in order to help pay for their own planes. Two people indicated that they used VA benefits which pay up to 90% of the cost for rentals and lessons needed to acquire instrument and/or commercial ratings. Thus, by formally enrolling in higher level training courses, these students spent many hours in the air for little out-of-pocket expense.

For all recreational flyers, *access to a plane* is obviously essential. Table 8-1 summarizes types of access to planes; it shows that over half our sample owned their own planes at the time of the interview or within the prior year. At least six of these persons bought their planes while they were still learning to fly. Two of them were owner-renters while the other four were part of groups of three or more owning one or two planes. All six were in either the MID or LO rated groups. Interestingly, all of our respondents in group ownership situations indicated that there was little or no friction over who was to use the plane(s). About 20% of our sample rented planes either privately or from the airport FBO. To our surprise neither of the two flyers with the lowest SER ratings rented planes. One was sole owner of a small plane, the other was 1/3 owner of a medium quality plane. Recreational flyers who owned their own planes, clearly the most preferred mode of access, were more numerous in all SER groups than we expected.

TABLE 8-1

TYPE OF ACCESS TO PLANE BY SER GROUP

Type of Access	HI % (n)	MID % (n)	LO % (n)	TOTAL % (n)
Private Owner	66 (8)	58 (7)	38 (5)	54 (20)
Partner Owner	17 (2)	0	8 (1)	8 (3)
Group Owner	0	17 (2)	23 (3)	14 (5)
Rent from FBO	17 (2)	17 (2)	23 (3)	18 (7)
Rent Privately	0	8 (1)	0	3 (1)
Access to Instructor	0	0	8 (1)	3 (1)
TOTAL	100%(12)	100%(12)	100%(13)	100%(37)

In order to fly, a place to take off from, learn, and return to earth is needed--in short, an airport. Almost all of the respondents who owned their own planes used the local county airport.³ For those who rented planes, especially student flyers, the airport they used

depended on the availability of and rates for plane rental and instruction. Some of them travelled 20 to 40 miles to other airports even though they lived within 10 miles of their county's airport. Often the more distant airports offered better access to rental planes, more comprehensive ground school training, more instructors, or ones with better reputations, personal relationships established by friends or family with management, and/or lower prices. A new county airport made it probable that more people from the local community would take the opportunity to start flying. The county airports did seem to stimulate people to begin flying, though privileged circumstances strongly shaped the experience. The data presented in Table 8-2 summarizes the importance of the county airports to our respondents when they were beginning students. The existence of county airports was somewhat less important to relatively affluent beginning flyers. Almost 60% of the flyers in the HI SER group had begun to fly *before* their county airport was built. But of those in the MID/LO group almost 90% learned after the airport was finished. In all over 70% (26) of our sample began flying after their county's airports were completed.⁴ Table 8-2· B shows that over 77% of those in this group learned or were learning at airports in their own counties. 60% of the flyers who learned at their county airports--33% of the entire sample--claimed that they never would have begun flying had the county airports not been built. The figures in Table 8-2 indicate that the existence of county airports accounted for a large number of new flyers.⁵

The diversity of the coincidences which acted as catalysts to produce flyers from "ordinary" men and women was extraordinary. In several cases, either free instruction or inexpensive use of planes was offered by good friends or relatives who were already flyers. Some cases had long histories. In a 1938 advertising campaign the Ford Motor Company brought small airshows to local grass airstrips, attracting people to see their new line of cars. The father of one of our flyers had been the local Ford dealer back then, and both his sons were given rides in the planes. The older boy was fascinated, became a pilot in World War II and later bought a plane. He subsequently taught his brother and cousin (also interviewed) how to fly. Another respondent, a dentist, met the

TABLE 8-2

IMPORTANCE OF COUNTY AIRPORTS TO BEGINNING FLYERS

	HI		OTHER		TOTAL	
	%	(n)	%	(n)	%	(n)
<u>A When Flyers Learned</u>						
Learned before county airport built	59	(7)	12 5	(3)	27 5	(10)
Learned after county airport built	41	(5)	87 5	(21)	72 5	(26)
TOTAL	100%	(12)	100 0%	(24)	100 0%	(36)
<u>B Flyers who Learned After County Airport Built</u>						
Learned at other airport	23	(6)				
Learned at County airport	77	(20)				
TOTAL	100%	(26)				
<u>C Flyers who Learned at County Airport</u>						
Would have learned anyway	40	(8)				
County airport crucial	60	(12)				
TOTAL	100%	(20)				

local flying instructor when he came for dental treatment. Similarly, a bank teller, who had at one time hoped to be an airline stewardess, met a depositor who happened to be a flying instructor. One man noted that he started learning soon after an emergency forced him to charter a plane and fly for the first time on a non-scheduled carrier, another just happened to meet a commercial pilot in a random social situation. Several people began flying as a result of noticing signs near their respective airports. In one case, a man was laid off from his job for a two month period and decided that he finally had time to learn how to fly. One local woman had had a lengthy interest in planes--her husband had been a pilot in the Marines, she lived under a Columbus Airport traffic pattern, and she had aspired to be a stewardess. On a visit to friends in Kentucky, she joined them in a trip to their local airport for some "excitement" and started to fly the week following her return to Ohio. Several other informants ascribed their first attempts at flying to a non-specific "urge" which occurred when the time was right. Thus many circumstances weave together the necessary prerequisites to enable the potential flyer to "take to the air"--to become a member of the subculture of the flyer.

FLYING IN RURAL OHIO THE NATURE OF A SUBCULTURE

As a recreational facility, a county airport can become the locus of a recreational flyers' subculture. The norms of this culture are likely to shape the ways people perceive and make use of the airtransport capacity, these uses in turn may make a difference to the community at large. For understanding this aspect of a county airports' impact on the larger community, a detailed study of the recreational flyers' subculture is called for. But for reasons both of research design and resource limitations, we were not able to conduct such a study. This limits the precision of our generalizations about this aspect of the social character of the county airport program, yet we found much of considerable interest. We will turn to these findings after a brief discussion of the notion of subculture as it applied to our inquiry here.

A subculture is such by virtue of "a set of social meanings shared by a group which varies from the generally shared meanings of the larger group. The members of a subculture have meanings in common that overlap with those of the larger group but are in some way different."⁶ In effect, recreational flyers, to comprise a subculture, would understand themselves to be a group within the community, but with special feelings and values concerning the shared activity of flying. Furthermore, they would be seen as a group with unique qualities by "non-members" in the community.⁷

Many, perhaps most, recreational flyers in our sample did feel themselves to be unique, possessed of special skills, and involved in a somewhat dangerous activity. Flyers viewed each other as "buddies," somehow different from ordinary folk. This kinship is evident in the fact that frequently, in gatherings of people quite unrelated to flying, a common interest in flying would bring strangers together. We heard many accounts of how one flyer would go out of his way to help another. Sometimes local flyers lent their cars to complete strangers who had landed at the nearby airport and had no other way to get into town. Certainly, as one flyer put it, he would "think nothing of offering another flyer a lift" when he would "never dream of picking up a hitchhiker."

While many forms of recreation offer challenge, flying entails danger and fear--and shared fear can be the most binding of forces.⁸ A student's first solo flight--an initiation ritual of sorts--combines the keen exhilaration of testing one's self in a demanding situation and the nervous fear of the grim consequences to follow--injury or worse--if all does not go well. This first time a flyer is in lonely control of his own fate marks his induction into the "fraternity."⁹ As a lasting symbol of this achievement, his shirt tails are cut off, inked with the date of the flight, and displayed in the local ready room. The test and ritual for "soloing" is one of those experience flyers share which sets them apart from the "earthbound."

The intrinsically dangerous nature of flying makes it an activity which cannot be carried on in a casual or cavalier way. It is said that

"There are old pilots and there are bold pilots, but there are no old, bold pilots " Flyers must learn how to handle a wide variety of imminent disasters, hence their avid preoccupation with "war stories " Endless hangar discussions concern ways of dealing with one unforeseen trouble or another, and "war stories" are an important part of the learning that emerges. They usually recount a "hairy experience" of the teller, a pilot colleague, or repeat one of the tales which are passed from generation to generation of pilots Such stories are often embellished in the telling, becoming almost legends with only remote connection to the actual events. But in the telling and retelling with particular local variations, these stories point up potential measures for coping with emergencies and seem to mark a process of group affirmation that even in the face of unexpected, sometimes very serious trouble, one can overcome-- wits will win out

In addition to the "war stories," flyers share information about each other, the condition of their equipment and of the airport, recent articles about flight safety and new rules and regulations, as well as non-aviation centered topics The local airport facility becomes the natural place where the flying community gathers A place where flyers can pass the time in discussion of mutual interests, it often comes to represent to them a haven from the more ordinary world

The testing and rituals, the sharing of actual or rumored extraordinary experiences, and the physical locus of activity are all aspects of any subculture They bind a group by reinforcing minimum norms of behavior, they nurture a folklore of tested wisdom believed necessary for survival and they provide an arena for associations which sets the participants a bit apart from the ordinary world But within these bounds there is considerable variation, stemming in part from individual personality differences and in part from particular social life situations In the next sections some of this variation, which certainly marked our sample of flyers, is explored In addition to a brief description of the sample's demographic characteristics, we discuss the frequency and extent of flying, the reasons behind it, and exposures to aviation-oriented organizations and publications.

The Demography of Some Ohio Flyers

The recreational flyers in our sample were overwhelmingly male, only 8% or 3 pilots in the sample were women, even though a special effort was made to get referrals to female pilots. Ages ranged from 17 to 70 with most of the sample over 30 years of age (See Table 8-3). Those in the 17-30 age range were either single or had married only recently and had started flying when single. Most of these younger flyers were supporting only themselves and thus seemed relatively more willing to spend their limited incomes on flying activities. By contrast, older pilots had family responsibilities and consequently were more cost conscious. For example, several men between 31 and 40 said they had waited until they felt financially able before they had taken on the expenses related to this activity. In the MID SER rated group most flyers were in the 31-40 age range, while in the LO SER group there was a relative preponderance of older flyers. The rather even distribution in the HI SER group suggests that this group is not as influenced as the others by financial considerations. This pattern is probably to be expected, but more generally, the higher the social and economic status of a married flyer, the more likely he will be able to fly in his younger years. The concentration of flyers between 31 and 50 is also to be expected. Recreational flying, even with new opportunities as in rural Ohio, is often too expensive for younger people and likely to be too physically demanding for those over 50. Notably, two of the seven oldest flyers had been military pilots in World War II, and six of these were in HI or MID groups.

TABLE 8-3 AGES OF RESPONDENTS BY SER GROUP

Years of Age	HI % (n)	MID % (n)	LO % (n)	TOTAL % (n)
Up to 30	8 (1)	17 (2)	15 (2)	14 (5)
31-40	33 (4)	50 (6)	23 (3)	35 (13)
41-50	25 (3)	17 (2)	54 (7)	32 (12)
51 and over	33 (4)	17 (2)	8 (1)	19 (7)
TOTAL	100% (12)	100% (12)	100% (13)	100% (37)

The Social Background. Our flyers came from quite diverse backgrounds. Several had come from larger cities though most were long time local residents. Occupations were quite varied, but no unskilled or semi-skilled factory workers and few mid-level office workers were represented. Among those flyers interviewed were a newspaper publisher, the owner of a 100 employee manufacturing plant, several rather prosperous farmers, several small businessmen, a mid-level civil servant, a mechanical engineer, a research geologist, a photo-engraver, a local bank vice president, a dentist, and the chief maintenance engineer of a nearby hospital. Surprisingly, two of the subjects were handicapped (one spastic, the other had limited use of a leg), yet were able to fly although often unable to participate in other "sports." Four respondents had been military pilots. Both these men had been quite active in making initial arrangements with the state to have airports built in their respective towns. Two other respondents had been unable to become military pilots and had had to wait many years to begin flying privately. Two women had aspired to become airline stewardesses, one had actually applied for training and had not been accepted.

Flight Activities. Three dimensions can be used to describe a pilot's involvement with aviation: how long he has been flying, how often he flies, and the geographical range of his flights. Taken together, these indicators give a reasonable picture of the extent of these flyers' activities. With reference to the first dimension, most of our sample (62%) had been flying over three years, over a fifth (22%) had more than six years of flying experience. Another 22% were relatively inexperienced, with from one to three years of flying, the rest were beginners.

Since flying is so expensive, we expected that the frequency of individual flights would be relatively spread out in time and that those in higher SER rated groups would report a much higher frequency. Neither of these expectancies was borne out. Table 8-4 presents data on flight frequencies and shows that fully three-fourths of our sample flew at least once a week, with over 40 percent taking to the air three or more times a week. It also turned out that a flyer's SER rating had little effect on how often he flew. About 20 percent of the whole sample noted

a significant decrease in flying activity as they became more experienced. In keeping with this, they also noted that the flying trips they currently made were more for transportation and less for "kicks" than their earlier trips had been.

TABLE 8-4
FLYING FREQUENCY NUMBER OF TRIPS

	%	(n)
Occasional (less than twice a month)	23	(7)
Weekly (once or twice a week)	35	(11)
Often (about 3 times a week)	19	(6)
Very often (4 or more times a week)	23	(7)
TOTAL	100%	(31)*

*Unknown for 6 informants

In addition to the intrinsically challenging mastery of aerobatics and the fascination of simply seeing one's usual two-dimensional world from the air, travel to distant places is frequently a strong motivation for engaging in recreational flying. It is, in fact, one of the especially encouraged themes in small aircraft sales promotions. Moreover, those who travel widely are likely to become more proficient pilots than those who stay close to their own locales. But the lure of far off places may not be terribly strong as far as our particular sample of flyers is concerned. Table 8-5 shows that less than a third of the group flew very far beyond Ohio, only about 200 miles on each side of its perimeter.

Several points qualify any simple interpretation, however. First, long distance air travel often requires dealing with weather problems. An instrument rating is really necessary for such flight. Without instrument assistance, a pilot may get weatherbound and stranded, be forced to make an emergency landing, or experience other delays. Only a few in the sample had instrument ratings and access to planes adequately equipped with instruments for flying in obscured conditions. Second, longer range air travel is rather more costly than flying around over the local corn fields. It takes more fuel, as well as transportation, food, and lodging at one's destination. Overnight plane rentals are often quite costly. These expenses far exceed what would normally be incurred in a local hop to the next county and back. But again, no simple, single factor can be adduced as the cause of the relatively confined flying done by our sample. For though the data presented in Table 8-5 suggest that there is a slight tendency for those in the HI SER group to travel well beyond familiar ground, there seems to be no particular relationship between social and economic status and taking long distance trips. And one suspects, in fact, that when the nearly 20 percent of the sample having only student status (all in the MID and LO rated groups) become full-fledged pilots, the amount of long range travel will be about evenly distributed across the sample.

TABLE 8-5
MAXIMUM DISTANCES OF FLIGHTS

	HI		MID		LO		TOTAL	
	%	(n)	%	(n)	%	(n)	%	(n)
All over, far out of state	36	(4)	27.5	(3)	25	(3)	30	(10)
Around state and nearby out of state	55	(6)	36	(4)	33.5	(4)	42	(14)
Local	9	(1)	9	(1)	8	(1)	9	(3)
Local because still a student	0	(0)	27.5	(3)	33.5	(4)	19	(7)
TOTAL	100%	(11)	100%	(11)	100%	(12)	100%	(34)

In contrast to the popular colorful imagery presented in aviation magazines, then, private air travel has not been used much by our sample for taking glamorous vacations. Only two pilots claimed to have taken long vacation trips by plane--both flew to the Bahamas. More modest vacation trips had been made by others to northern Michigan, a popular resort area for Ohioans. Only two flyers took advantage of their airplanes to get to otherwise inaccessible spots. One other pilot who used his plane for long trips had come from an urban area several years before. He explained that he would never have been able to remain in a small rural town of 14,000 had he not been able to fly off to New York City or to Connecticut to attend the theatre, shop and otherwise enjoy the more varied atmosphere of the urbane East.

Beyond its recreative and practical aspects, travel outside one's own immediate area has the potential for expanding one's view of himself and broadening one's perspective of his community. The relatively low incidence of long range travel among our sample, however, indicated that probing this interesting dimension of a flying subculture would not yield much immediate insight.

Associational Aspects of the Recreational Flying Subculture. Formal organizations and associations are often a distinguishing mark of a vigorous subculture. They provide a means for drawing together people with common interests and enabling them to feel a part of a group. Such associations also act as communications exchanges, they offer opportunities for newcomers to learn informal norms and folkways from more senior members, and they help to keep interest in mutually valued activities from eroding.

For the Ohio recreational flyer participation in several types of organizations was common. At the local level, four of the five counties we studied had formal or informal "Pilots Associations."¹⁰ Like many volunteer organizations, membership in these associations was loosely maintained and often simply a matter of whether a person had "gotten around to joining" yet. Except for a few very active members in each town, flyers usually came to meetings when they were interested in the topic to be presented. Held once or twice a month, association meetings

typically included films and/or lectures, often by FAA representatives, concerning aviation safety, new regulations, and other aviation-related topics. The associations frequently took very active roles in persuading local government to make improvements to the airports. In effect, they represented the most vocal flying interest group in town, often putting on special, small scale fund raising drives and occasionally doing airport maintenance or improvement work themselves with or without financial support from the county. And, in addition to interacting with the more official bodies in the counties, State Division of Aviation representatives frequently tried to work through the more active members of pilots' associations.

Different regional, national and international associations also invite the affiliation of local groups and pilots. The largest and most generalized of these is the Aircraft Owners and Pilots Association (AOPA). This is a coordinating group which loosely ties together local pilots' associations through its regular publications and represents the interests of general aviation in numerous political environments. While the variety of national organizations is extensive, for many of our respondents the AOPA was the only non-local group to which they belonged.¹¹

If the local pilot's association is an important organizational aspect of the flyer's subculture, the airport and its flight operations provide the crucial locus of interchange between flyers. In this sense, the county airports were of fundamental importance to the subculture, they were the places where the more communal aspect of flying centers and where a good deal of "hangar flying" and "war stories" swapping occurs. These are the verbal, interactive aspects of the flyers' group through which its skills are exchanged and values reinforced. Relaxing together for hours at a time inside or out in front of the terminal building, flyers teach each other, sometimes entertain one another, but always reaffirm their shared interests and values. Those who do a lot of "hangar flying" see themselves as full participants in the flying community. But there are others who take a much more casual approach, viewing an airport as little more than a parking lot and aircraft service station. These pilots may be quite active aviators, but they seem

to have little sense of or need for the social aspects of the flying community. To some extent they are marginal members of the subculture

Being a flyer is often seen as a source of social status. But flyers who were rated in the HI SER group were also likely to have other associations from which they derive their sense of social status. It is probable, therefore, that they would engage less frequently in the social aspects of flying as a means for accruing social status. Conversely, activities which bestow social status available to those with MID or LO SER ratings are likely to be less numerous. Therefore we expected that those rated in the HI SER group would be less likely than flyers with lower SER ratings to be involved in the socializing activities at the airport terminal

Table 8-6 presents data on the amount of non-flying time which pilots spent at the airport--a rough substitute for active socializing. Even though the sample is rather small, the anticipated difference among the SER groups is clearly indicated. Less than 10 percent of those in the HI SER group spent much time socializing at the airport, while 82 percent of the LO group spent a good deal of their extra time there. Of the 21 pilots who indicated they came to the airport for socializing only "occasionally or less," 90 percent were in the HI or MID SER groups, 69 percent of those in the "frequent or more" category come from the LO SER group. This suggests that there are systematic differences within the larger community of flyers in terms of the social meaning they attribute to flying--a topic which will be discussed later in this chapter.

An important aspect of a subculture are events giving particular significance to the group's activities, and recreational flying has its own special events. Some of these are large nationally publicized airshows which feature many different attractions. The most often noted are the Experimental Planes Association Airshow, held yearly in Oshkosh, Wisconsin, and the annual airshow in Reading, Pennsylvania. The latter is perhaps the most widely attended aviation event in the United States. But these events--"fly-ins" in the pilot's jargon--are held regionally as well. The pattern of interest and attendance at this important flying community occasion echoes something of the relationship between SER rating and activity noted in time spent at the local airport.

TABLE 8-6

RELATIVE AMOUNTS OF NON-FLYING TIME SPENT AT AIRPORT^a

I BY SER GROUP	HI		MID		LO		TOTAL	
	%	(n)	%	(n)	%	(n)	%	(n) ^b
Little or None	50	(6)	55	(6)	0	(0)	35	(12)
Occasional	42	(5)	18	(2)	18	(2)	26	(9)
Frequent	8	(1)	27	(3)	55	(6)	30	(10)
Almost All Spare Time	0	(0)	0	(0)	27	(3)	9	(3)
TOTAL	100%	(12)	100%	(11)	100%	(11)	100%	(34)
II PERCENT DISTRIBUTION								
Occasional or Less	52		38		10		100%	(21)
Frequent or More	8		23		69		100%	(13)
TOTAL								(34)

^aNot including time directly related to flight preparation, the relative amounts of time designated by the four categories included under I are as follows *Little or None*: the flyer rarely socialized for more than a few minutes at the airport and doesn't go there when he isn't planning to fly or take care of flying-related business. *Occasional*. the flyer sometimes spends an extra hour or so socializing at the airport but rarely goes there just to socialize; *Frequent*. the flyer spends extra time socializing at the airport each week and may go there several times a week when he does not plan to fly; *Almost All Spare Time*: the flyer spends most of his free time at the airport.

^bNo responses from 3 informants

Summarized in Table 8-7, the data suggest that fly-ins are of most interest to those who were rated in the LO SER group, although there is a strong minority of enthusiasts among the HI and MID groups. Most of the flyers that frequently attended these events were from the LO and MID groups, and over 40 percent of those in the HI group were really not interested at all. This finding parallels the apparently casual attitude toward local airport activity reflected in HI SER people noted

above The two findings suggest that social events, even rather special and often dramatic ones such as the "fly-ins," with their variety of competitive events--"tail-dragging," aerobatics, etc ,--do not have a great deal of salience for higher status people, but provide considerable interest to those in the lower status groups

TABLE 8-7

INTEREST IN FLY-INS BY SER GROUP

	HI	MID	LO	TOTAL
	% (n)	% (n)	% (n)	% (n)*
Like very much, attend as much as possible or at least frequently	33 (4)	45 (4)	69 (9)	50 (1)
OK attend infrequently	25 (3)	22 (2)	23 (3)	24 (8)
Not interested, rarely attend	42 (5)	33 (3)	8 (4)	26 (9)
TOTAL	100% (12)	100% (9)*	100% (13)	100% (34)

*
(For 3 informants in the MID group responses were not known)

Thus far the discussion has been predominantly concerned with quite general aspects of recreational flying and its subculture In an effort to "unpeel" the outer layers from the subculture and reveal more of the variations within it, we asked our flyers about their main flying-related interests Unfortunately time limits in the interview situation prevented asking everyone in the sample Twenty seven flyers were presented a list compiled from popular aviation magazines and asked to indicate the one or two activities that interested them most Table 8-8 summarizes their replies A quick scanning shows that even with such a small sample, a definite pattern emerges, one which could be expected on the basis of findings discussed thus far

TABLE 8-8

SPECIAL FLYING RELATED INTERESTS BY SER GROUP

(for 27 respondents)

	% Distribution			TOTAL	
	HI	MID	LO	%	(n)
<u>1 Group & social activity</u>					
flying club participation	9	45.5	45.5	41	(11)
watch or perform aerobatics	17	33	50	22	(6)
antique planes	0	40	60	19	(5)
<u>2 Technical Aspects</u>					
flight safety	14	43	43	26	(7)
motors/mechanics	33	17	50	22	(6)
flight control equipment	0	0	100	7	(2)
aerial photography	100	0	0	7	(2)
<u>3 Policy and Special Uses</u>					
airport improvement policy	60	20	20	37	(10)
military aviation	67	0	33	11	(3)
corporate flying	100	0	0	7	(2)

Consistent with previous findings, the activities associated with the group or social aspect of flying were most attractive to those rated in the LO to MID SER groups. As we could expect by now, flying club participation was of most overall interest, though it had little special attraction to those in the HI SER group. This was also the case for two activities closely associated with "fly-ins," and other gatherings of flyers. The technical aspects of flying also seemed to be quite interesting to both the MID and LO SER groups, with the exception of aerial

photography Two flyers in the HI group had taken to this rather esoteric and demanding technical activity Finally, those interests which might be described as policy concerns and special types of aviation were more compelling to HI SER flyers than to the other groups The interest in airport improvement policy, particularly, suggests that even though these pilots were not drawn to the more everyday communal aspects of "hangar flying," etc , they felt concern for the flying community in general It also suggests that these people, who were more likely to have had political experience, were more inclined to become involved in the political/governance questions of airport development.

We were also interested in the reflections of the subculture revealed by the types of popular aviation literature and the selective appeal of various topics to our flyers.¹² In a sense this was a search for indirect indicators of the character of interest and concerns they showed¹³ We found that an unexpected number of publications exist in this country which are directed to the flying "market " There are more than a dozen nationally distributed magazines available on the newsstands These are complemented by a number of magazines and newsletters published by various organizations and addressed to different special interests within the flying community. While few respondents were interested in the smaller, more specialized publication, almost three quarters of our sample read the major popular aviation magazines fairly regularly¹⁴

The contents of these magazines are generally quite similar, even if their format and apparent emphases are not They review new aviation regulations and report on new instruments and accessories Performance reviews of new and used aircraft are interspersed with myriad "how-to-do-it" and "what-I-did-wrong-with-the-widget" pieces. Curiously, while they contain articles and advertisements tempting people to travel, to go ballooning or gliding, or to engage in aerobatics, few of our sample attended to these materials Drawing the most interest by far were those articles describing the experiences of flyers in a host of potentially dangerous situations Articles related to safety and to the coping experiences of other pilots present readers with vicarious "war stories "

These are written versions of tales which might have been told during "hangar flying," and serve to educate flyers about what to do in dangerous situations. This sort of communication is clearly a major function of such magazines. Because most pilots aspire to own better and more capable planes, information on new aircraft also drew attention. And then there are useful inclusions of new rules and regulations which must be kept up with, and these are duly consulted. The relative preference of various aviation magazine topics is presented in Table 8-9. Surprisingly, none of these reading interests relates strongly to flyers' SER index ratings. SER ratings, as we shall see, proves to be a more significant indicator of the different meanings that pilots attribute to flying.

TABLE 8-9
PREFERRED FEATURES IN POPULAR AVIATION MAGAZINES

	%	(n)
Safety	22.5	(14)
Others' Experiences	22.5	(14)
New Planes	17.5	(11)
Rules & General Information	11	(7)
Old/Antique Planes	9.5	(6)
Performance	8	(5)
Gadgets	4.5	(3)
Experimental Planes and Jets	4.5	(3)
TOTAL	100.0%	(63)*

*Each informant was asked for as many responses as possible. Four people said they read everything and had no real preferences, their responses are not shown on the table.

MEANINGS OF FLIGHT

Central to this research project are the various effects which a small rural airport might have on the lives and actions of different social groups and through them upon the broader community. An understanding of these effects requires an exploration of the variety of *meanings* pilots associate with flight, for people act and experience the world in terms of their own structures of meaning.¹⁵ But such structures of meaning are complex and difficult to probe, even when research is not limited in time and in resources as ours was.

Given such limitations, we necessarily had to avoid the complex maze linking the two worlds of personal and social meaning.¹⁶ We were limited to a quite pragmatic approach in exploring personal meanings. But it should be at least noted that while we found that flying has a host of different practical meanings among pilots, virtually all have felt at some time a sense of awe at the wonder of flight. To pilot a plane is to have the sense of being borne up by the wind, far above the earthbound. Perhaps aviation is modern technology's counterpart to the more "primitive" shaman's transformation into a bird--symbolizing man's urge to divorce himself from everyday existence and fly "closer to the gods." In the myth and art of many cultures the bird is a symbol of the spirit. To fly can have for some the sense of taking one step nearer to the powers of the universe. However strong that sense may have been for some of our respondents, it would have been far beyond our resources to probe the underlying religious and psychological meanings associated with flight. Rather than collect a series of idiosyncratic personal responses to flying, we set out to identify a set of variables which could address our whole sample. Based on responses to a series of quite open-ended questions designed to evoke as full a set of responses as possible, the apparent personal meanings flyers attach to the act of flight as well as attendant social meanings are set forth below.

Personal Meanings

During the course of this study, our understanding grew from relatively unstructured notions which became progressively more refined until we could construct a set of rough hypotheses relating the personal meanings of flying to the socioeconomic status of the informants ¹⁷ The rationale for these hypotheses, founded on intuitive notions of behavior and values associated with different socioeconomic groups, is generally explained below using groupings of the different "meanings of flying" ¹⁸

Table 8-10 summarizes the categories of meaning that emerged from the pilots' own definitions of what flying meant to them

TABLE 8-10

PERSONAL MEANINGS OF FLYING (for 37 respondents)

	# of responses	% of respondents
(1) Relaxation & Enjoyment	20	54
(2) Challenge & Skill Development	19	51
(3) Improved Image of Self as Social Being	18	49
(4) Escape or Withdrawal from Everyday World	15	41
(5) Increased Physical Mobility	12	32
(6) Wonder of Being Airborne	10	27
(7) Adventure & Risk	10	27
(8) New Learning Experience	8	22
(9) Saving Time	7	19
(10) Appreciation of Machines	4	11
(11) Other	3	8

Flying afforded opportunities for relaxation and enjoyment for more than half of the flyers in our sample. The challenge of flight provided many flyers (51%) with the feeling that they were developing particular skills or that they were independently asserting new forms of control and discipline. Another common feeling (expressed by 49% of the sample) was that being a pilot offers an opportunity for one to improve his image of himself as a social being. The most frequent expression of this personal meaning pointed to participation within a special group, the aviation community. Other more internalized perceptions related to increased sense of responsibility, individualism, self-confidence, or, in one case, to overcoming physical handicap, and often to just plain showing off. Many flyers (41%) also noted the distinct association of escape or withdrawal with flying. The total concentration required of a pilot, the solitude and peacefulness of being aloft, and the associated opportunity to get new perspectives on one's everyday world were different versions of this general theme. Somewhat related, but more emotional, were the numerous expressions (31%) of sheer wonder at being airborne—the beauty of nature, the other-worldly physical reality of the flyer, and the related feelings of mystery, personal insignificance or religious appreciation. A less ethereal (and, to a non-flyer, quite understandable) meaning of flight was adventure and risk—the thrill of speeding through the air and the inherent dangers and unpredictability of the act of flying was voiced by over a quarter (27%) of the pilots in our sample.

Consistent with other findings, though perhaps still surprising, is the fact that only a minority of pilots associated flying with increased physical mobility (32%) or with saving time (19%). It is likely that these two obvious instrumental incentives for learning to fly would be more prevalent in geographic regions that are less well-served by other means of transportation than Ohio is, or where there are more remote locations and inaccessible communities than are found in Ohio.

The educational dimension of flying (noted by 22%), an almost esthetic appreciation for the airplane as a machine (11%) and, frequently expressed notions of patriotism, futurism and creativity complete the typology of personal meanings offered by the flyers in the sample. One surprising

omission was that none of the informants saw flying as enhancing his "playboy image," a meaning which most of the popular flying magazines stress.¹⁹

Emergent Hypotheses on Personal Meanings of Flying Do pilots with different backgrounds (i.e., SER ratings) attribute different personal meanings to their flight-related activities? Informed by the interviews with out sample of flyers, some hypotheses were drawn for the purpose of organizing our findings on the personal meanings attached to flying. These hypotheses are stated below, and the findings associated with them presented in Table 8-11. They are strongly supported by our data and perhaps best reinforced by the words of some of the pilots themselves.

Pilots in the HI-rated SER group view saving time and increased mobility as more meaningful aspects of flying than those in the LO SER group do. The rationale for this hypothesis is that persons in the higher SER groups tend to experience more time pressures and do more travelling than others. Therefore flying is more likely to be viewed by them as a highly useful activity for some, as a special opportunity to get around, for others, primarily as a time saver in their normal daily tasks. "We can travel much more easily." "Flying gives me a chance to be home with my family more or to take my wife with me on trips."

Pilots in the HI-rated SER group view continued learning as a more meaningful aspect of flying than those in the LO SER group do. Persons with higher educational attainment (a variable clearly associated with SER rating) tend to be more interested than those with less education in continued learning experiences. "I never want to stop learning about new things and flying is a chance to keep on learning."

Pilots in the LO or MID group associate flying activities with an improved self-image as a social being more than do HI SER rated pilots. This notion is borne out by feelings expressed about association with an aviation group and about personal achievement. As mentioned earlier, people in the lower SER groups tend to spend considerable time socializing and are more likely to interact with flyers as a part of a group. "Boy, the guys who fly are a much nicer bunch of people." They'd really go out of their way to help another flyer out." Conversely, persons in

higher SER groups tend to have less free time available in general than do others. Their relationships with friends are more likely to be between couples or for business purposes than they are to be formed on the basis of a common interest only. Persons in lower SER groups are probably less likely than others to have experienced extensive social acknowledgment for their personal achievements. Thus, these people might be expected to have their self-confidence particularly bolstered by success in learning to fly, an act viewed by many to be a considerable intellectual achievement as well as a strong act of will. "I didn't really think I could learn to pass my test but I did even better than someone I always thought was smarter."

Persons of all SER groups are likely to find equally meaningful the relaxation and enjoyment, challenge and skill development, adventure and risk taking experiences, escape or withdrawal, the wonder of being airborne, and the interest in machines derived from flying. For most of the personal meanings attached to flying, then, there was no reason to think that SER rating would be an important explanatory variable. These meanings largely derive from values imparted through male socialization processes in our culture. Thus, the largely male flying population could be expected to reflect such values as challenge and skill development, adventure and risk taking, and interest in machines, irrespective of their individual SER rating. "You really have to pay attention up there. you never know what'll happen next." "I've always liked machines, and planes are the ultimate in transportation machines." Other meanings included in this hypothesis, e.g., relaxation and escape, are not likely even to be related to the sex of the flyer.

What the patterns implied by these hypotheses signify is far from clear, yet even a bit of speculation regarding the potential social significance of the personal meanings of flying is suggestive. The extensive variety of personal meanings attached to flying is arresting. Certainly a scanning of Table 8-11 should provide some insights to almost every reader, especially planners or policymakers, most of whom are accustomed to making simple generalizations on how particular technologies are perceived by a variety of users. It is apparent that some of the variation in the importance of personal meanings attributed to recreational

flying accords markedly with variations in the social status of flyers. More precise research could aid considerably in understanding the range of potential responses to different kinds of technological innovations, organizational developments or regulatory modifications in the field of general aviation. Technology assessments based on equity considerations could benefit from insights regarding the subjective side of user responses

TABLE 8-11

DISTRIBUTION OF PERSONAL MEANINGS OF FLYING BY SER GP

Personal Meaning ¹	Percent Distribution ²			Comment or Skew Observed
	HI	MID	LO	
Increased Mobility (5)	50	42	8	Clearly HI
Saving Time (9)	57	29	14	Clearly HI
Continued Learning (8)	50	25	25	Clearly HI
Improved Self-Image (3)	22	39	39	Toward MID and LO
Relaxation and Enjoyment (1)	40	25	35	Fairly even
Challenge and Skill Development (2)	31	38	31	Even
Adventure and Risk (7)	40	0	60	Fairly even (No MID)
Escape or Withdrawal (4)	33	14	51	Fairly even
Wonder of Being Airborne (6)	30	30	40	Fairly even
Interest in Machines (10)	25	0	75	Clearly LO (but insufficient data)

¹Numbers in parentheses refer to the order of presentation of these categories of meaning in Table 8-10 which shows the number of respondents for each category.

²Recall that the population sampled (37 flyers) was divided into SER groups of the following sizes HI = 12, MID = 12, LO = 13. Thus for any category of meaning, a purely uniform distribution would be HI = 32.5%, MID = 32.5%, LO = 35%. Note also that there were more responses per person in the HI and LO groups.

Social Meanings and Interactions. Flying has not only personal significance, it may also affect the relationships a pilot has with others. Association with other flyers makes new friendships possible and travel brings a flyer into contacts with new people and ideas. Simply being identified as a flyer may change one's status among friends. Thus the social interactions involved with flying are likely to impinge upon the flyer and affect his potential relationships within the community. To gain some perspectives on this social aspect of recreational flying, questions were asked of pilots about new friendships made through flying, the special uses of flying they made, how flying affected their relationships with others. The findings are summarized in Table 8-12.²⁰

TABLE 8-12
SOCIAL MEANINGS OF FLYING

	%	(n)
<i>Social Interactions Within Community</i>		
Extend social contacts (status independent)	67	(28)
Increase status in peer group	27	(10)
Acquire new "upwardly mobile" friendships	8	(3)
Increase interactions with "important people" (other flyers)	5	(2)
Intensify former friendships	3	(1)
<i>Effects Beyond Local Community</i>		
Extend social contacts (status/non-status oriented)	27	(10)
Maintain "roots" or contacts with family/ friends over distance	27	(10)
<i>Relationship to Flying Community</i>		
Enjoyment of group flying activities	14	(5)
Airport is place to go when bored	11	(4)
Common flying interest helpful in making friends in alien social environment	5	(2)
<i>Actions Enhancing One's Social Image of Himself</i>		
Affirm one's high socio-economic status	8	(3)
Affirm that one is unique	8	(3)

The most frequently cited social meanings of flying clustered around *social interactions in the community*. Two-thirds of our pilots declared that becoming a pilot had helped to extend their social contacts in the community. Few respondents, however, were able to cite deep friendships they had made. For most flyers, new social contacts were limited to casual "airport buddies". Over a quarter of the pilots also suggested that they seemed to acquire increased status within their peer groups.²¹ Relatively few flyers, however, viewed their aviation activity as a catalyst either for raising their social status in the community as a whole or for strengthening or weakening their former (pre-flying) friendships.

In general the flyers did not perceive flying to have any extensive effects on their social lives *beyond their own communities*. Only about a quarter of the flyers felt their aviation activities enable them to maintain more frequent contacts with distant friends or relatives.²² An equivalent number believed they made new social contacts outside their community through their flying involvements. However, further probing disclosed that only about 8% of the pilots regularly saw any of the acquaintances or friends whom they met in other places through flying activities. For the others, the "extended contacts" consisted of some familiar faces at a strange airport.

Pilots also spoke of their *relationships to the flying community*. For 14 percent of the sample (1 MID and 4 LO) group flying activities were particularly appealing, while 8% simply liked to go to the airport when they were bored. For some pilots, flying activities served the psychological function of *enhancing their own social image* by affirming either their high socio-economic status or their uniqueness. In such cases it is not clear whether or not there were any associated changes in the flyer's social interactions.

In addition to trying to assess more "abstract" social meanings of flying, we asked the pilots some questions concerning more specific *impacts of flying on their social interactions*. We found no indication that any recreational flyer had become more involved in community undertakings or politics as a result of his flying activities or through

friends made via aviation. Almost half our sample said that they had made some new friends through flying, and several maintained that very close friendships had grown out of their originally practical partnerships in owning planes. But none of those interviewed saw their involvements in flying-related activities to be so all-encompassing as to have caused weakened friendships with non-flyers. Almost a third of our respondents felt they had influenced friends to start flying.

In summary, there is little evidence that participation in recreational flying facilitated any upward social mobility among our pilots. Perhaps this finding holds only for rural settings where "everybody knows everybody" and where one's social place is clearly defined. Still, even if flying didn't have any real effect on the flyer's social position in the settings we studied, it certainly made some of them feel special--often to the point of believing that others saw them as special, although we could not tell if this was actually the case.²³ Finally, some of the more sophisticated flyers, whose social milieus had extended beyond their communities of residence when they began to fly, did use flying to maintain and further expand their social worlds. On the other hand, flyers whose social horizons were primarily bounded by their local communities perceived flying as simply a form of recreation to be enjoyed with local friends.

Mixing the Social with Business. Many of the flyers in our sample came from the upper and middle classes of their communities. They were significant figures in the internal social, economic, and political patterns that characterize small rural communities in Ohio. Therefore, it is not surprising that the social aspects of flying became mixed with its use in conducting commercial affairs. In this sense the social and economic meanings of "recreational" flying become quite intertwined blending in one motive for flying with another. One obviously can enjoy the adventure of flying on the way to a business meeting in the next county. Some flyers in our sample had come to depend on having access to general aviation facilities and had geared their styles of conducting business accordingly. An inventor, for example, flies to nearby states to market and arrange for manufacture of his inventions, a contractor has flown to

Haiti to supervise the construction of a free clinic supported by his church, a land developer flies out of state occasionally to inspect possible investments in real estate

Of particular interest in this mixing of social and commercial uses of aviation is the fact that our sample contained many self-employed businessmen or partners in small businesses. Often these "small businessmen" were able to afford flying because they deducted part of its cost from their income taxes as a business-related expense.²⁵ (This sensitive point was difficult to raise at the interviews and often had to be guessed at from the context of the discussion. At least 30% of our sample clearly appeared to take such deductions, while an additional 16% probably did so.) In most cases it was unclear whether a man's flying was a crucial aspect of his business. Rather it seemed to be a kind of style with particular meaning for these pilots. The image of a businessman-flyer is an ambivalent one in commercial situations, swooping in to "talk business" has varied status meanings associated with it. A few people felt it enhanced their image to arrive in a plane to see a client, but one professional consultant pointed out that, although use of a plane was important for his work, he was careful not to alienate his clients by appearing in a "fancy" plane. He had heard them make several negative comments about others who had made flashy displays.

As might be expected, the people mentioning business uses of flying were primarily in the HI or MID SER groups. More than 80% of the HI or MID SER groups made some business uses of aviation, whereas only about 40% of the LO SER groups included business uses in their flying activities. For some self-employed people flying has become an important part of the way they conduct their businesses. Almost a quarter of our respondents noted that they arranged their businesses deliberately to incorporate flying and have thus become quite dependent on aviation. Table 8-13 presents our findings on the business usage of flying by this sample of pilots. Over 40% used flying to keep up contacts with clients, suppliers, colleagues, and agents, and almost 20% have found flying helpful for enlarging their circle of business contacts. Over half of the respondents said they fly to occasional out-of-town meetings which they could attend

by using other forms of transportation. A few people (8%) noted that their occasional use of flying to entertain clients had helped to strengthen their business relationships.

TABLE 8-13
BUSINESS USAGE OF FLYING^a

Response	Individuals offering this response ^b	
	%	n
Occasional use of flying for meetings, etc	54	20
Facilitates maintaining business contacts	41	15
Business has come to depend on flying	24	9
Facilitates making new and distant business contacts	19	7
Emergency business use	19	7
Used as an attraction to entertain business associates	8	3

^a Total (n = 37)

^b Individuals offered multiple responses

But frequently distributions do not tell the whole story. It is instructive to illustrate more specifically the considerable variety of business-related flying activities presented by our small sample of pilots. For example, a prosperous pig farmer, who had his own expensive, single engine plane needed rapid transportation, because he was never able to leave his farm for more than three or four days as any number of severe problems might arise. Without his airplane, he simply could not have travelled any distance. Other farmers fly over their own land to view their crops. A developer similarly showed his land to prospective buyers. Flying was noted by a geologist as useful in spotting potential pollution problems from oil rigs and other equipment so they could be corrected before his clients faced being fined. But the most unique use of an airplane we found was made by one respondent who claimed that

his marriage has taken place in his own plane at 6,000 feet and that its legality was in question'

Because these particular examples as well as the information summarized in Table 8-13 are drawn from a sample of primarily "recreational flyers" rather than business aviators, it is particularly difficult to generalize from these findings. They should, however, complement to some extent the material presented in the chapter on business uses of flying. At minimum these sample findings illustrate the varied interests and associated patterns within the recreational flyers' community. We now examine those interests and patterns in terms of the flyers' family relations.

The Meaning of Flying for Family Relations. Flying is an activity which requires considerable time and money. It also involves a degree of perceived, sometimes real, danger. At the same time the great mobility it offers brings with it the chance for attractive family projects. Thus flying can have both positive and negative effects on family relationships. Of particular interest in this regard are the degree to which family members perceived flying costs as a financial burden, the degree to which flying-related activities brought families together or divided them, and the degree to which families took advantage of increased mobility potentials. About 40% of our respondents had some reflections on the impact of flying on their families. Their comments are summarized in Table 8-14.

Apparently financial problems linked to flying were not an important element in family relationships. Presumably, if there are difficulties in this regard, one does not continue or even take up flying. Only one person noted that the costs of flying presented a problem. In the many other cases where we sensed this problem might be apparent, more pointed questions were asked and negative replies were received. Thus, if a person continued to fly it apparently meant that family priorities had been sufficiently agreed upon so that the costs didn't cause friction. An alternative interpretation is that the expenses of flying creates such ambivalence in the minds of some flyers that this topic becomes taboo for them.

TABLE 8-14

MEANINGS OF FLYING TO THE FAMILY BY SER GROUP^a

Response	Individuals offering this response ^b							
	HI %	(n)	MID %	(n)	LO %	(n)	TOTAL %	(n)
<u>Family Benefit</u>								
Offers wider choice of vacations and entertainment	44	(7)	44	(7)	12	(2)	100	(16)
Provides family participation recreation	50	(7)	36	(5)	14	(2)	100	(14)
Enables more time to be spent with family, as a result of decreased business travel time	45	(5)	36	(4)	19	(2)	100	(11)
Holds scattered family members together across distance	83	(5)	17	(1)	0	(0)	100	(6)
Strengthens parent-child ties	50	(3)	17	(1)	33	(2)	100	(6)
<u>Family Tension</u>								
Causes problems with spouse regarding time spent flying or in flying-related activities	0	(0)	33	(1)	67	(2)	100	(3)
Causes problems with spouses regarding money used for flying	0	(0)	0	(0)	100	(1)	100	(1)
Minimizes time spent with family	0	(0)	0	(0)	100	(2)	100	(2)

^aTotal n = 37.^bIndividuals offered multiple responses.

The pattern of data Table 8-14 permits several other observations. First, those in the HI SER rated group seem to involve their families a good deal more with their flying than did other groups, especially the

LO SER group Second, an appreciation of the opportunity private air travel affords for a wider choice of vacations and for maintaining families was evident, although this is not uniformly shown in the data. Those in the HI SER group were much more likely to voice this interest.

These results of our exploration of the personal and social meanings of flying, though based on a small sample, have returned interesting, if not conclusive, findings. The presence of the airports did seem to stimulate new entries into the world of recreational flying. But the responses to such an entry vary markedly among the various socioeconomic groups we identified.

In summary, as we cast our net among all those who used the local airport for non-commercial activities, we found people of different ages, incomes, and social background. In such a group we learned the "activity" of flying is likely to vary with length of aviation experience, and the recent frequency, range and purpose of air travel. Particular interests a flyer might have in flying also vary, reflecting the rich set of possibilities encompassed by the technological capacity of airborne mobility. Such diversity, especially based on our small sample, makes it difficult to generalize with confidence about the patterns that seemed to emerge, though, we repeat, the consistent differences observed between higher status pilots and their lower status colleagues are suggestive. We conclude this chapter with a summary and some further interpretation.

OBSERVATIONS ON THE IMPACT OF THE COUNTY AIRPORT PROGRAM ON RECREATIONAL FLYING AND RURAL COMMUNITY LIFE

Within the broader context of our study, this chapter has probed some of the implications of the Ohio County Airport Program for the stimulation and strengthening of a flying subculture in rural Ohio communities. It concludes with a summary of the direct and indirect influences on recreational flyers emanating from these new, improved airports. Embedded in that summary are qualifications of the impact probabilities mentioned at the outset of this chapter (p. 221).

Direct Impacts The Airport as a Locus of a Rural Flying Subculture

The construction of county airports provided the minimum physical and organizational prerequisites for recreational flying in the surveyed communities. Each airport offered a paved, maintained runway of suitable length, tie-downs for parked planes, gasoline, restrooms, and a telephone. Given these basic facilities, licensed pilots could base their plane at local county airports and use them whenever the weather permitted. But facilities and a license alone are but the externals identifying subculture, and have little effect on local communities. In what ways was the airport essential to the rural flying subculture? The airport's fixed base operator (FBO) was an important, perhaps crucial, catalyst for the formation and development of a flying subculture in some of these communities. He provided the additional services necessary for recreational flyers: plane maintenance, sales and rentals, flying instruction, and dawn-to-dusk management. The FBO and the facilities he managed consequently made it more convenient and safer for a private flyer to base his plane at the county airport. Though the airport is naturally the central location at which flying communities might congregate, it took interest and support on the part of the FBO's to provide the necessary stimulus for that "community" to become more organized and active. Indeed, the FBO often provided the impetus for the formation of a local pilots' association.

All five airports included in this portion of the study had current groups of private flyers. When the FBO's were active, so were the local groups. The FBO knew almost all of the local flyers, he or his hired instructor had helped, or was helping, many of the local recreational flyers to get their private pilot's licenses. And many of the local flyers had either bought or sold their planes with the help of the FBO. Over 20% of the flyers interviewed acknowledged that were it not for the FBO, they probably would not be flying at all. Another 16% noted the importance of the FBO for their enjoyment of the flying experience.

Other factors variously related to the existence of local airports, stimulated recreational flying. In two communities surveyed regularly appearing newspaper articles publicizing airport activities helped play up the attractions of recreational flying. More generally, it should be noted that in each of our communities there had been a local group of active flyers before the county airport was constructed, that over a quarter of our pilots were flying before their local airports were built. Often a grass strip, sometimes still in operation, had been available to the adventurous for flying lessons, tie-down facilities and gasoline. Typically, when the county airport was built, most of the local flyers moved their planes there to take advantage of the better runway facilities. However, there were still some flyers who continued to base their planes at the old grass strips either because they liked the owners, because of strong friendships with the group of flyers who had been there through the years, or because the services were cheaper than at the county airport.

Considering the more general relationship between the county airports and local recreational flying, we conclude that the arrival of the airport was a necessary, though hardly sufficient, factor in the expansion of existing local interest in flying. In many of these counties, airports were already being considered by the local community when the Ohio County Airport Development Program was announced. Some of the strongest local support, in fact, was provided by those citizens who were either ex-military pilots or long-time recreational flyers.²⁷ Thus, a small but firmly committed subculture of flyers, *already formed by the mid-1960's*, helped facilitate its growth by taking advantage of the opportunity offered by Governor Rhodes' airport construction program.²⁸

The differences among the flyers of various socio-economic and rurally oriented (SER) groups in their respective characteristics and responses to flying set the background for the more indirect influences of the recreational flyer in the communities studied. The most dramatic differences occurred between the groups rated as HI and LO on the SER index, with the MID group scattered between them. By definition the

HI group was the best educated, had most social status and highest income and was likely to have a worldly, less provincial view of things. In contrast with the group rated LO they were also a bit older, with more flight experience and tended to range farther afield in their air travel. They tended to identify much less with the local "flying group", they spent less time at the airport in activities unrelated to actual flights and had a good deal less interest in special subculture events such as regional "fly-ins." In a sense these HI status flyers carried the perspectives of their vocations into aviation activities. For them, flying took on a more mixed recreational and commercial tone. Part of its attraction was to enable them to save time and to travel further by air for business dealings. This group was also much more interested in the policy aspects of airport development than in the social group activities surrounding recreational flying. Finally, they saw considerable benefit for their whole families in their avocation as pilots. Definite groups within the flying subculture emerge, then, each tending to play a different role in maintaining that subculture. Those who valued the social aspects provided the day-to-day bonds that help integrate the subculture and furnish the airport management with an important local clientele. Those who remained more remote from the group activities contributed, in their turn, much of the skill for dealing with the County Commissioners, they were often members of the Airport Authorities and, with the FBOs, looked after the airports' "political" relationships.

Indirect Impacts: The Airport as a Catalyst for (Non-Economic) Shifts in Rural Community Life

At the outset of this chapter, a series of questions was posed about the potential indirect impacts of the improved air transport capacity upon rural community life. We expected that the local airports might rather directly influence the lives of local flyers which, in turn, could affect life in rural Ohio communities. But in this regard there was little to indicate a significant impact on the communities.

at large. The hypotheses discussed below are based on the kinds of effects which can reasonably be imagined, they are drawn from general notions of how a technology may be experienced and perceived by those in contact with it

Leadership in the development of the airport was a close identification with an activity conferring stature on its participants and facilitating their leadership capacities. Our findings cannot lend any support to this hypothesis. There was no example in our survey of a pilot whose flying activities may have been even partially responsible for his emergence as a community leader. It appeared that none of the flyers, who were not active in community affairs before the county airport was built, had assumed community leadership positions during the past few years. Moreover, none of the flyers who had been community leaders prior to the airport construction enjoyed any notable recent increases in community visibility. Our survey clearly sheds some doubt on any hypothesis that links the recreational flying activity with the actual emergence of new leaders in rural communities.

Since flying activities frequently bring a mix of unacquainted people, including high status individuals, together, *recreational use of the county airport might provide noticeable increases in the social mobility of some citizens in rural communities.* None of the recreational flyers interviewed suggested that through their flying activities they had made local friendships that they were unlikely to have made anyway. Friendship was simply defined as a relationship that involved getting together socially for occasions other than flying. Several flyers, to be sure, believed that some of the people they occasionally interacted with at the airport were not typical of their normal acquaintances ("How else could I get to talk with a doctor as an equal?"), yet none of these interactions were categorized as friendships by these flyers themselves. Of course, our investigation could not trace possible indirect impacts upon social mobility gained by a flyer whose aviation accomplishments increased his self-confidence.

Because air travel affords an opportunity to range far beyond one's local community, *recreational flying by rural citizens may be linked to*

any increased awareness by their community of the "outside world". In addressing this hypothesis, we searched for any indication whatsoever that there was an indirect, even symbolic broadening of a rural community's horizons when the local airport, a potential spring board to the world outside, was used by a group of its citizens. But it was discovered that only a few of the pilots interviewed flew great distances from their immediate geographic regions. Thus it is not surprising that there was virtually no evidence to suggest much change in individual or community awareness. It did seem, however, that flying was used by a small number of pilots to maintain *already existing* contacts with the "outside" world. Closely related to such broadening would be any indication of increased, active concern for the federal or state government regulation of aviation activity or taxes. But again, rural recreational flying did not seem to cause any broadening of perceptions of social or political "place" in the world for either the flyers or their communities. Certainly perceptions of the world have broadened in rural communities over the past several decades, but radio and television were certainly much more significant technological facilitators than were airports.

A concluding note. Before this field research was begun, we had little sense of the feasibility of combining a limited "subculture study" with other aspects of a technology assessment experiment. Such a perspective, coming out of sociology and anthropology, is not very often included in empirically based technology assessment projects. Yet it is an appropriate part of such an effort, for it focuses on an important social component of the technology--the social groups which are directly associated with it. In our case, the flyers can be viewed both as operators and consumers; they helped make the airport function as they simultaneously used its facilities and services. How such activities affected their perceptions and experiences is relevant to a fully adequate technology assessment. One can imagine other subcultures associated with other technologies: the operators of nuclear power stations, the families of the crews of large super tankers, and the skilled core of radar technicians and ground controlled approach (GCA) operators.

at all large airports. Variations in the designs of technologies and their organizational imperatives will alter the lives of their operators, as well as their consumers, in particular ways. These consequences may turn out to be much more significant than we might intuitively expect-- they should be included in any technology assessment exercise, along with more traditional dimensions of the technological impact. This look at recreational flying in rural Ohio has been, essentially, a part of the "feasibility" experiment described in Parts I and IV of this report. In the final chapter to Part II, an overall summary of the substantive findings from the study of the Ohio County Airport Program is presented, in Part IV there is a return to evaluative and methodological concerns.

NOTES

¹The SER index scores for the 37 informants ranged from 7 to 29.5. We divided the informants into 4 groups based on these scores: Group 1, 25-29.5 (12 members); Group 2, 19.5-24.5 (12 members); Group 3, 13-17.5 (11 members), Group 4, 7.5-9.5 (2 members).

²HI=Group 1, MID=Group 2, LO=Group 3 and Group 4. The LO Group in fact is closer to what sociologists would call middle to lower-middle class than a true "lower class."

³Two of them, however, farmers who had airplane hangars and landing strips on their farms, used the county strips only in bad weather. Also some flyers, with whom we did not speak, apparently used nearby grass strips instead of the county airports.

⁴But of the 10 pilots who had begun flying before their county airports were completed, 2 of them noted that they started in anticipation of the new airport.

⁵Of course more extensive surveys of flyers both in towns with airports nearby and in those without access to any airport would be necessary to determine more precisely the degree of importance.

⁶J. D. Douglas, *Introduction to Sociology* (New York: Free Press, 1973), p. 548.

⁷One limitation of this portion of the study is that a systematic exploration of how the community-at-large viewed recreational flyers was impossible. There are, however, a number of indications that the "Sunday flyers," as they were sometimes described, were seen clearly, if not very sympathetically, as a special group.

⁸But fear in binding together flyers functions differently from that which exists among soldiers, in that the latter is a more directly communal experience. See J. Glenn Gray, *The Warriors--Reflections on Men in Battle* (New York: Perennial, 1973).

⁹"Soloing" is the crucial step, and often fear of being alone in a plane prevents flying students who have had much experience from taking their first solo flight.

¹⁰In the remaining county, an attempt had been made to organize a Pilot's Association but it somehow failed due in part to a lack of support from other flyers and in part to an indifferent FBO.

¹¹As an example of the special interests such groups may represent, in July 1973 a major aviation magazine listed annual meetings or conventions for: The Flying Dentists Association, The Negro Airmen International, the National Priest Pilots Association, The American Navion Society, and the Flying Physicians Association. Recently, a new type of organization emerged to provide services to general aviation similar to those provided to motorists by the AAA. One such group advertises reservation bookings at "flying resorts" and regular hotels and motels, information regarding plane-accessible outdoor recreation areas, organized fly-in campout trips, discounts on accessories and on some accommodations, auto rental reservations, a chart service, a monthly magazine, and a newsletter. Other groups of interest to our subjects included The Curl Air Patrol, the Experimental Planes Association, The Stearman (antique plane) Restoration Society, and the Flying Farmers. While only five of our respondents belonged to any of these national groups, membership in national groups is probably greater in more urban areas.

¹²We asked our subjects as well about their other recreational activities to gain some insights on their involvements with aviation. But only a few responses were enlightening. Six flyers had owned motorcycles, several had raced them and cars and boats as well. These six were fascinated by motors and speed, saw flying as the next logical step toward man's dominance over machines, and viewed planes as the most nearly perfect machines. Several persons had been involved as children in making model planes; one still makes radio controlled models. At least five informants mentioned their continual participation in family recreational activities; for them flying was another family activity. One person saw flying and his other hobby scuba diving, as essentially similar--both requiring skill and daring and both transporting one into other dimensions.

¹³For a discussion of the functions and methods of such indirect approaches to social science knowledge, see Webb, Eugene J., et. al., *Unobtrusive Indicators* (Chicago: Rand McNally, 1972). Our study of popular literature combined with respondents' stated perceptions is an example of seeking multiple measures of the same phenomenon, a technique stressed in this cited work.

¹⁴For example, *Plane and Pilots, Flying, Air Progress, Sport Flying: The Magazine of Fun Flying, Aviation Travel. The Sports and Leisure Magazine for People who Fly, and Airport World. The Voice of Airport and Fixed Base Operator Corporation Pilots and Aerobatic Performers.*

¹⁵For extensive treatment of this perspective, which also argues that personal aspects of meaning, in turn, are based on prior social experience, see P. Berger, and Thomas Luckman, *The Social Construction of Reality*, New York. Doubleday Anchor, 1967.

¹⁶The translation from personal to social meanings is a fundamental mission of the social sciences. An elementary but thoughtful discussion of the need and difficulty of executing this translation is provided in C. Wright Mills, *The Sociological Imagination* (New York Oxford University Press, 1959).

¹⁷Respondents were asked to mention as many reasons for flying as they chose; therefore verbal skill was a key factor determining the quantity of responses. In the Methodological Appendix a detailed analysis of the response distribution is presented. We were concerned to determine any significant biases in the data that were apparent among the three SER groups. The respondents in the MID rated group averaged fewer responses than either of the other two. We can offer no obvious explanation for this difference; the results discussed below should be read within this context. Where we do develop hypotheses concerning SER group differences, we limit our contrast to those between the HI and LO groups, using MID group results only to highlight these contrasts.

¹⁸The important methodological point here, to be discussed more fully in chapters 10 and 11, is that categories of meaning evolved from our field research. Hypotheses, then, were refined after data collection rather than being fully formulated as a prelude to field research.

¹⁹This popularized image of flying was expected to be among the "meanings" cited by informants. But since most of the subjects were married men, they may not consciously have perceived flying as making them attractive to women or been willing to reveal such a perception. Also, a woman conducted most of the interviews, which might have prevented many subjects from discussing their fantasies.

²⁰ Instances where SER ratings appear to make a difference in explaining variations among respondents are noted in the discussion below.

²¹ It is perhaps informative that 6 of the 10 pilots sharing this perception were in SER group MID, while none were in SER group HI. This confirmed our expectations that persons of relatively lower socioeconomic status would tend to use their involvement in a daring and expensive activity to impress others. Furthermore, although we asked subtly, none of our informants saw flying was an opportunity to conspicuously display wealth.

²² Not unexpectedly, 8 of these 10 respondents were in the HI SER group and 2 in the MID group.

²³ No interviews of the non-flying community were conducted to ascertain the salience of "flyers" as a unique, perhaps elite, group.

²⁴ The "personal style of doing business" is also discussed in Chapter Seven as a key variable determining the use of non-scheduled aviation by executives with firms with facilities in rural Ohio.

²⁵ In large cities, the population of private flyers potentially includes more white collar office workers employed by large businesses than it does in small towns. Tax deductions for flying would be more difficult to obtain for this group than for the small town businessman. Thus it is probable that persons in cities with larger incomes than those who are self-employed in small towns might be excluded from participation in aviation because the incentive of partial "recreational" subsidy through tax deductions does not apply to them.

²⁶ Since our sample included only those who were actually involved with flying, we could not determine how frequently financial problems prevented people from flying. Also, those people who had been active in flying and had had to "retire," as it were, either for financial or other family reasons were not interviewed

²⁷ In this regard it is worth recalling that Ohio's interest in aviation dates back to the Wright Brothers and, in some parts of the state include direct contact with flying during the early days of cross county mail service

²⁸ A similar situation characterized the role of existing local air-oriented corporations in helping to bring the airport program to these counties.

CHAPTER NINE

AIRTRANSPORT CAPACITY AND THE ASSESSMENT OF SOCIAL IMPACT: A SUMMARY OF FINDINGS

In this summary of findings from our search in rural Ohio for the possible effects of improved air transport capacity upon rural communities, we will be returning to the notion of *technology as social capacity* outlined in Chapters One and Two. Cast in terms of the new or improved capacities delivered by the Ohio County Airport Program, the field experience provides materials for a more refined understanding of the capabilities made available to seven sample rural communities. In this notion of capacity little attention is given the usual empirical indicators of technical capacity--the average number of landings per day, the bearing strength of the runway, the number of tie-down aprons, etc., at each airport. While these data could have been gathered, they would afford little if any insight into the social capacities. Rather, the airport was viewed as making the capacity available for involving people in new combinations of activities which have various meanings for them and which might be translated into changes in their relationship with each other and in their sense of community. Both the way in which we have reformulated technical capacity and the character of the impacts we sought, therefore, necessarily keep us some distance from developing quantified sums (though perhaps this could be done in some future study). Presented below, then, is a summary of the findings we developed in answer to the questions posed in Chapter Two.

AIRTRANSPORT AS SOCIAL CAPACITY

In analyzing airtransport as a social force it is useful to consider three distinct aspects of airtransport capacity: the creation of the capacity, the existence of the capacity, and the use of the capacity. Each

of these could be expected to produce different effects. Figure 9-1 shows the logical sequence in which they can be seen to be related.

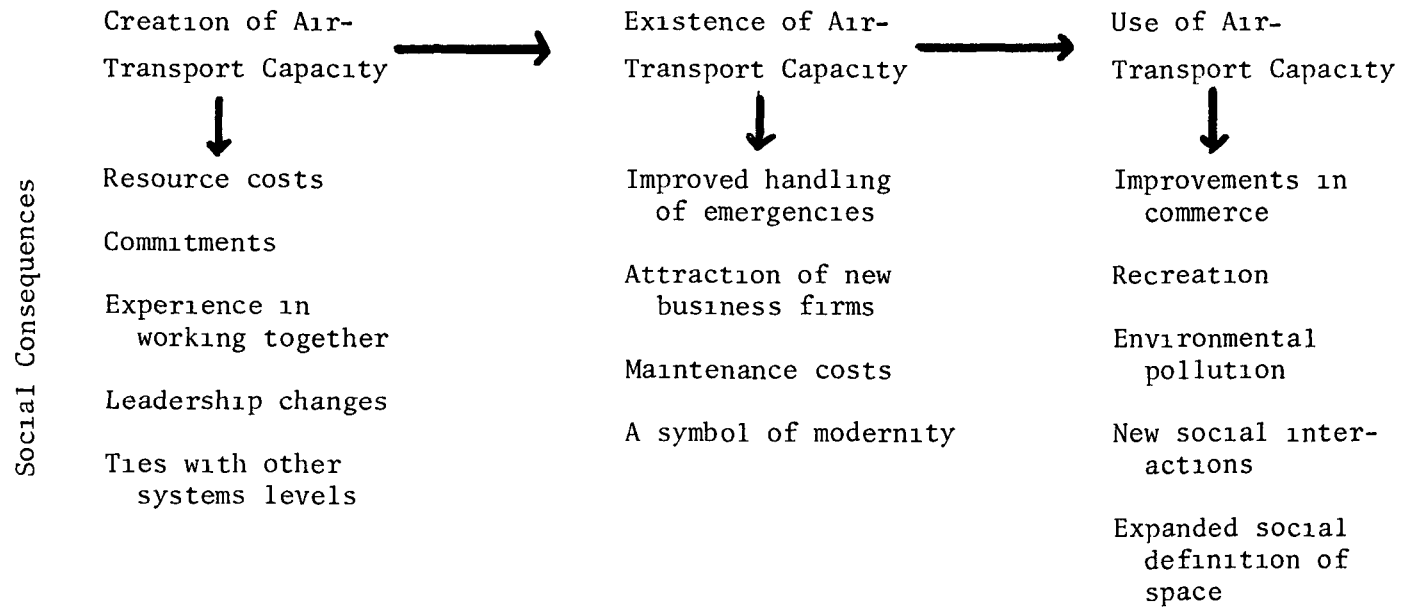
I: Creation of Airtransport Capacity

Any technology, from stone axes to missile systems, must be constructed or brought together before it can be used. Requiring both technical processes and social processes, creation of the capacity perforce has social consequences of its own. Thus any attempt later to assess the consequences of new or improved technological development must take into account the social effects prompted by the consequences of construction. These consequences are likely to be quite different in character from those of the other two phases. The construction phase will produce some effects that remain independent of the operational phases as well as those that come in connection with the shaping or determining of the actual operational phases.

Resource Costs. One obvious consequence of the construction of an airport is the opportunity cost of the resources it uses. The same money could have been spent for a library; the same land could have been used for farming; the same construction equipment could have been put to work on the roads. Recognition of opportunity costs is implicit in complaints that surfaced (albeit rarely) during our field inquiry, such as one questioning whether money is wisely spent on "Sunday flyers." In general, the Ohio County airports were inexpensive ones, and in six of the seven counties we found only very little resentment or residual complaint about the use of resources. Certainly in those six there was no obvious evidence that the communities had distorted priorities by putting too much into the airport. (Indeed, a good deal of Crabtree's efforts were devoted to making sure that they would not be.) Most other community projects cost as much or more than the airport, so the diversion of resources could not have been regarded as very serious. Some complaints were heard in some of the counties at the time of construction--from farmers, for example, who wanted the county's land to stay in crops--but these objections generally subsided.

FIGURE 9-1

AIRTRANSPORT CAPACITIES AND PLAUSIBLE SOCIAL CONSEQUENCES



However, in one county, Jackson, the extraordinarily high costs of the construction process (nearly \$300,000) nearly broke the county, according to most sources there. That outcome has been an important deterrent to further community development, and the county still labors under the burdensome consequences of construction of its airport.

Commitment. In building a small airport, a community undertakes many important commitments which shape the social future even if they have no immediate consequences. An obvious example is the commitment to a certain site. The choice of site is a prediction, perhaps self-fulfilling, about where the town will grow; a boost to the value of some lands and not others; a commitment to having certain traffic patterns on the ground. All of these factors will in some way shape the community's future.

In the Ohio program certain operational commitments were also made formally to the state: that the airport be kept open to the public for twenty years and that the airport be managed. These are commitments to at least minimal costs of maintenance and operation in the future, and they are opportunity-cost commitments for the use of the land.

These costs were major ones for the counties, but difficult to identify precisely. In Knox, the location of the airport so close to an existing private airport guaranteed some redundancy in capacity and the possibility of needless friction and competition between the two airports. In Jackson, an airport that lost its legitimacy at the start will continue to exact cost for nearly twenty more years. In three of the counties where farm land was used for the airport, this important land use commitment will have indefinite effects. But still, aside from the problems at Jackson, these commitments seemed to be well within the capacities of local communities.

Experience in Working Together. Building an airport, even with outside aid, is a job for many hands. There must be supplies, money, land, equipment, construction skills, encouragement, plans, and much more. It is reasonable to expect that a community might well come out of the activity more sure of its own organizing abilities, and more ready to take on some similar job in the future.

In general, it appeared that the airport project had not made a big difference in this regard. In one county, Vinton, the smallest of the communities investigated, there clearly was such a gain, for the airport was the only major community project of recent years, and the community experienced a good deal of pride in it. In another county, Jackson again, the experience seems to have left the county more divided, depleted, and unsure of itself than before--mostly because of intense reactions to high cost overruns. In the other counties, Knox in particular, there had been so many community improvement projects during the past decade, many of them larger than the airport, that by comparison the airport represented only a marginal addition to community experience.

Leadership Changes. Any community project that uses resources which could have been used elsewhere will draw opponents as well as advocates. The particular persons favoring or opposing the project gain in prominence or notoriety and experience. This wider exposure may reveal a person's good qualities or faults, his particular expertise may become more valuable or less valuable, and he may gain or lose important political leverage implicit in the resources at stake in the project being decided on. It seemed reasonable to expect that the airport construction project might, like major issues or events on the national scene, at least create new leaders or cause old ones to be set aside. Such was not the case, we found no changes in political leadership or power that could be confidently related to the developments surrounding the airport program. Changes in leadership did occur in these towns, but the changes had to be attributed to many causes, most of them more significant than the airport.

Three features of this lack of impact should be noted. First, the basic *structure* of formal and informal leadership patterns in these towns, consistent with the findings of many studies of small communities,¹ was the same as it had been in the years before the airports. We found no evidence of changes in the pattern. Second, although changes did occur in the

identity of formal officeholders, including three unexpected election losses by county commissioners who had supported the airports, in each case strong complicating factors subordinated the importance of the airport as an issue--factors such as inept campaign strategy and as stubbornness on the part of the incumbent. New formal officeholders also became members of the Airport Authorities in various counties, but most of these persons were already prominent formally or informally, and the influence of those who were not didn't extend beyond airport matters. Third, a very few new *informal leaders* emerged within this program, but the membership of the central informal leadership structure did not change as a result of the airport program.

Because all of the counties we studied joined the Ohio County Airport Program fairly early, they may be the very ones in which leadership changes would be *least* expected to have occurred as a result of airport development. Their early enlistment in the Program suggests that these counties already had a fairly strong leadership predisposed to having an airport. A study of latecomers to the Program might have revealed quite different outcomes for county leadership patterns, though we did not hear of any such.

Ties with Other Levels of Government: System Complexity. State and Federal agencies provide funding for airport construction, specifications for the construction itself, and assistance in community planning. These additional ties between levels of government would represent additional complexity in the social system, complexity stimulated by a technological development. However, in the case of the Ohio county airports, these ties were transitory ones, lasting only through the construction period. Indeed, a complaint heard in the counties was that the State had nearly abandoned them after the construction was over.

The counties had many smaller ties to the State and Federal governments--tax computations on aviation gas, aircraft inspections, and so forth. But these regulatory consequences are endemic to all aviation activity, and so not directly traceable to the increased use of aviation spurred by the new county airports.

The creation of new technical capacity is a continuing effort, of course. However, not even further major improvements, such as new locally financed hangars or the improvements made possible by Phase Two of the Program, acted on the resources, commitments, community experience, leadership patterns, and ties with other governmental levels in a way significantly different from what has been described above. Nor do the efforts such as those undertaken by a pilot's association to add minor improvements (a new rotating beacon, the paneling of an airport lobby), interesting developments in themselves, change what we saw in the conditions described above.

II. Existence of the Capacity for Air Mobility

An airport is a transport capacity, not the transport itself. The capacity will permit or even stimulate actual transport, but the mere existence of the capacity has its own social effects. It provides facilities which may be used in emergencies, attract regular business users, incur continued operation costs; and often these facilities and outcomes will affect a community's image of itself.

Improved Handling of Emergencies. In addition to routine landings, technologically advanced airports can serve important functions in emergencies. Injured persons and medical supplies can be flown in to hospitals or out to hospitals; disabled aircraft can be brought down safely; military planes can use the airfield and nonmilitary ones can be mobilized.

The improvement in aviation safety brought about by the county airport system was clearly recognized by Ohio's Department of Aviation and, as Chapter Three notes, was one of the reasons why Crabtree pushed the program. It is now true that a plane in the air over Ohio is never more than about twenty miles from paved runway. The fact is that accidents have been averted through the availability of these airports, and lives saved--though there is no clear way to estimate the extent of this social consequence or its value with respect to the costs of the project.

The "military preparedness" argument was not one we had expected to hear about at all, but we did from several pilots. Since this latent capacity has never been called upon, it is difficult to evaluate.

Attraction of New Business Firms. The availability of air transport capacity is important to those who need it or are accustomed to relying on it. The county airports increase the availability of air transport to these towns, and many business firms use aviation extensively. It can be argued therefore, that the County Airport Program will make these towns more attractive to business firms and that local economic development should be stimulated by corporate decisions to locate new plants in these towns. In the promotion of the County Airport Program, Crabtree put great emphasis on this consequence of the Program. And, as we saw in Chapter Two, the same argument permeates the literature on airport development and is strongly pressed by aviation interest groups.

In Ohio, however, such economic impact was not so simple a cause-effect matter in practice; the evidence indicates little if any effect by the county airports on corporate location decisions. As Chapter Seven indicates, such very limited economic impact made it plausible for us to adopt the "null hypothesis" of no change and then seek to disprove it. We could not do so on the basis of our work in seven counties.

Three types of information were available on the attraction of airports to expanding corporations. First, the stories of several evident successes told by Crabtree and others at the Division of Aviation suggested numbers of instances where this had occurred. In one such situation we even saw a copy of a communication between a county and a firm in which the county commission pledged a new airport as a condition for the firm's relocation. But in our counties, selected on grounds other than particular plant locations, it seemed clear that generalizing these stories may be hazardous.

Second, we drew on the opinions of a few state officials in the Division of Economic and Community Development. Here the results were mixed. One official urged the importance of aviation for economic

development, describing his own efforts to convince the local communities; another said simply, "You can't really prove that an industry came only because of an airport." None of the officials was able to supply convincing documentation on the subject.²

Third, as reported in Chapter Seven, we talked directly and in depth with a number of corporate officials, asking them about the importance of the airport in their decisions to expand or to locate in the rural county. In every case the airport was acknowledged as an appreciated convenience; but there were no cases in which it was said to be the primary or even principal reason for the location or expansion decision. Other considerations, such as the labor supply, were more important.

In combination, these sources of insight are suggestive but, of necessity, not conclusive. Nor have any studies ever produced thorough and convincing evidence about the relationship (positive or negative) between airports and economic development. But in the absence of such proof, even dubious officials seem to have made a sort of Pascal's wager: They take the position that since small general aviation airports, and particularly those of the County Airport Program, were not very expensive, they were worth having in case they really might matter. As the same state official just quoted put it, these airports were "too economical to be without." Community leaders who were actually involved in bargaining with potential new industries indicated that the airport was at least a useful extra lever; they would prefer to go into a bargaining situation with airport access as a selling point.

Maintenance Costs. The airtransport capacity, once in existence, must be maintained. In a sense, this commitment is a spillover from the creation of the capacity, but it is a continuing necessity fed by the natural depreciation of the airport and the constraints of its associated activities. Grass has to be mowed, light bills, insurance premiums, and managers have to be paid, the runway has to be repaved, and so forth. Maintenance is a drain on resources, and the ways in which it is provided have social consequences.

Although we do not have enough detailed information to attach a dollar figure to these maintenance costs, we know they are significant

in view of the limited income of the airport manager and the conservative budgets of county governments. As a consequence, two sorts of social impact were evident. First, in most of the cases where social friction arose, it resulted from ambiguous and temporary agreements regarding relative responsibility for the various absorbing costs. Commissioners, FBO's, county employees and others who were tied to basic commitments to the airports bickered among themselves about the maintenance responsibilities. Second, there was increasing commitment to the airport on the part of those who voluntarily contributed maintenance and improvement efforts, especially recreational flyers and corporate users.

A Symbol of Modernity. Aviation is a modern technology--the fastest and most glamorous form of transportation today. Hence it could be expected that access to aviation--possession of an airport--would have important symbolic meaning to the community.

The importance of the airport as a symbol emerged as one of the strongest findings in our investigation. People interviewed door-to-door frequently made comments such as, "We have to keep up with the times" or "It put us on the map" or "A town this size should have one". The Chamber of Commerce brochures play up this aspect of the airport, and the publicity during the fund-raising projects and dedications emphasized that an airport would put the community into the modern world. A brochure used in two counties showed a door opening *into*, not out of, Ohio. This sentiment and pride, strongest in Vinton, the poorest of the counties in Ohio, was evident in every one of our counties.³

The social consequences named in this section have been defined as differences made by the presence of the county airport. Obviously, differences between the county airports themselves and differences in the prior airport capacities of the counties could influence those differences. But no such influence was evident among the counties we studied. Some airports had different equipment--one had jet fuel, one did not have strobe lights--but these differences did not explain any variation in the dependent variables just listed. Low and high symbolic

value and the impact on plant location decisions were similar for all our counties and were insensitive to these technological variations. Similarly, the level of prior airport capacity--very high for Knox, very low for Vinton--did not significantly color our findings about impact.

III: USE OF THE CAPACITY FOR AIR MOBILITY

We have seen so far that the creation of the airport capacity and the mere existence of the capacity may have social consequences of their own. Some of these consequences, such as improved flight safety, could themselves be the aims of airport policy. Nonetheless, an obvious result of these first two phases is the actual putting to use of mobility itself--the ongoing movements of people and goods in and out of town by air. The possible social consequences of the mobility per se extend to the effects of change in commercial activity, recreational uses, environmental quality and to less tangible changes in social interaction and perceptions of spatial relationships.

Improvements in Commerce. Aviation often has clear commercial advantages over other forms of transportation in certain situations--usually when speed is crucial, or geographic area remote. Presumably business firms use aviation when circumstances call for these advantages. So it seems likely that increases in the use of aviation on the part of business represent improvements in the commercial activities in the town--dollars and hours saved for other productive uses.

Chapter Seven gives a number of examples of such savings--production lines kept working, executive decisions facilitated, and so forth. Clearly each of these represents an improvement over what would have been the case without aviation. It would be nearly impossible to put a dollar value on the aggregate of these events. Moreover, attributing savings to the county airport remains a serious problem, since in most cases some form of aviation other than that provided by the county airport was available at a somewhat greater remove with nearly as much savings. Nevertheless enough examples of various business uses were discovered

which are not covered in usual economic indicators to suggest that the airport made detectable though small economic contributions to local commercial operations.

Another argument for airtransport-prompted commercial activities could be that travelers to or through the town would spend money on food, shelter, or other items. This certainly happens in large metropolitan areas, and no doubt some of it happened in these rural towns. However, no great emphasis was given this "tourist" factor in the counties we visited--with the possible exception of Vinton--and we found no significant evidence of it. None of the airports had such things as shops, tourist brochures, restaurants, hotel listings, or area road maps.

Air travel itself is an economic activity--people are employed at the airport, gas is sold, and flyers take out loans on airplanes and buy sunglasses. Again, however, we found no evidence that the airport itself was a significant economic spur to local business.

Recreation. Flying is one way to reach remote recreational areas; in some cases it is the only feasible way. Flying itself is a sport. So air transportation may be expected to increase, in some aggregate sense, the recreation levels achieved by the society.

There is little doubt that recreational flying has increased in the counties, although our interview data suggests that the county airports were not solely responsible for the increase. For those who had been flying for some time, the county airport provided only marginal improvements in arrangements already worked out.⁴ A significant group had taken up flying recently--many through some contact with the county airports. In the more general context of a nationwide increase in recreational flying the Ohio county airports may be seen as convenient, enabling facilities.

Environmental Pollution. Pollution is a major problem at metropolitan airports. Nearby residents complain about noise, and jet exhaust fumes build up rapidly to dangerous levels. Great efforts have to be made to reduce these problems. It was necessary, therefore, to include the problems of environmental pollution on a checklist of possible airport related consequences, although we hypothesized that for

such small airports there would be no perception of an environmental problem.

The hypothesis turned out to be correct. In more than 150 interviews with persons in seven counties, no complaints about either noise or air pollution were registered. The most likely explanation for this finding is also the most obvious--these towns are uncrowded, and the airports used infrequently (in comparison to metropolitan airports), thus noise and environmental problems simply never reached objectionable levels.

New Social Interactions. When a person takes up a new activity, on the job or during his leisure time, he often meets new people and establishes a new circle of friends or working partners with similar interests. These new relationships may then be extended into other areas of the person's work or recreational life. It seemed reasonable, therefore, that airport activities could bring together persons who might not otherwise have met or worked together and that these relationships would be extended into other social activities.

Apparently this transference of interactions is predictable experience only for an urbanized population, for we encountered no evidence of it. We asked about such factors as whether existing cliques or barriers had been broken down or new ones created by relations among flyers, whether new flyers' families had increased associations with one another in activities other than flying, and whether new pilots made other pilots their friends or made their friends into pilots. The interview data makes it clear that social interactions changed little. It also suggests that the reason lies in the special nature of small towns, in which everybody already "knows everybody else" and social status is relatively immutable.

Such new interactions might have also been expected from the airport construction phase, the creation of the capacity, but they seem not to have been significant in that situation either.

Expanded Social Definition of Space. Air transportation carries a town's citizens to remote locations and back, and it brings in outsiders to a town. The social interactions thus engendered would be

different ones, for the people concerned, from those to which they are accustomed, and with increasing use such contacts would become accustomed routine rather than extraordinary events. Depending on the nature, intensity, and frequency of these interactions, it would not be surprising if the townspeople developed a broader awareness of other worlds outside their own, and if so this should be reflected in their thoughts, their actions, and their culture.⁵

In the interviews and in retrospective review of newspapers and brochures concerning each of our airports we found very little evidence of increased awareness of, or reference to, other areas. A reasonable explanation is that a few dozen flights a day are not a sufficient avenue for the outer world to penetrate beyond the already more massive incursions of the automobile, television, the telephone, and newspapers.

The importance of the airport as a symbol, mentioned before, makes for an interesting twist on this question of exposure. Though the airport seemed to encourage these people to think more of themselves *vis à vis* the rest of the world, frequently the image projected was one of the airport as a window *from* the world *into* the town. The more-to-be-expected conception of an airport as an avenue *out* into the world beyond is reversed.

An important reason why each of these hypothesized consequences was not found to be very significant in our counties is that Ohio is already well blessed with other forms of communication and physical mobility. Communication is often a social substitute for transportation, and Ohio has a full complement of newspapers, telephones, and television. Furthermore, as we have seen, Ohio has good highways, three trunk-line metropolitan airports, good rail freight service, and even good river and lake transportation. None of the counties are so far from one of the major airports that using scheduled air travel is impractical, and most of Ohio's rural areas have a smaller regional airport (e.g., the Findlay, Lima, and Portsmouth airports) within thirty miles. Most of the aviation-using corporations we interviewed claimed that if their county had never built airports they would use one of these other airports without enduring unacceptable inconveniences. Many corporate

pilots, moreover, elected to use regional or metropolitan airports anyway, because of their better landing conditions. (However, none of the user companies said that the county airports were of no incremental value to them.) Finally, all but one of the seven counties had experienced some general aviation activity prior to the county airport program.

The availability of forms of mobility and communication is generally shaped by geography and culture. The geography and culture of Ohio are optimal for forms of transportation and communication that compete with air transport, so the social effects brought about by changes in air transport capacity are correspondingly muted. We would expect that for places like the Yukon, where ground transportation is nearly impossible, or in underdeveloped countries, that additional air transportation (and, therefore, new capacity for it) would have greater social consequences.⁶

KEY DETERMINANTS OF AIR TRANSPORT CAPACITY

In Ohio, the creation, existence, and use of the air transport capacity were not carried out only within the county system removed from outside, exogenous influence. Each depends on the presence or extent of other elements in the social make-up of the county. For simplicity, we have grouped the elements into two simple categories: the *resources* needed for the capacity, and the *demand* for the capacity. In other words, the creation, existence, and use of the capacity are for the moment taken to be dependent variables. As in the case of indicators of social capacity, a detailed empirical operationalization of the concepts has not been employed. Rather, the logic inherent in concrete examples will serve to convey the point. Furthermore, since our focus has been on understanding the role of capacity, and not on disentangling the entire interrelated social system, many of the possible relationships among variables discussed thus far have had to be ignored.

Demand for Airtransport

The airtransport capacity will not be used unless there is a demand of some sort for its use. We shall examine in the context of our counties what different forms the demand may take and what differences those forms can make.

Chapter Seven discusses the concept of a potential, or latent, market for business aviation. The size of this market would depend on several factors, including the number and size of firms in the area and the nature of their products. The additional business turned up by ambitious airport operators (FBO's) and the business lost by poor ones indicates that an untapped market does exist. The utilization of market also clearly depends on social as well as economic factors. There is as well the established, more or less certain, business market--business usage of air transport that has become customary. In only two counties, William and Knox, was that relatively stable market much in evidence.

The question arises as to how big a market is necessary or sufficient to support a given airport--to make it worthwhile for the operator or anyone else to maintain the existence of the particular airtransport capacity. In our interviews with FBO's frequent references were made to the insufficiency of the market for air operations as an excuse or reason for lack of airport business. There was some suggestion made that the county airport program had built too many airports--i.e., had more than saturated the potential aviation market. This point is taken up again below.

The potential demand for recreational flying is even harder to fathom. The evidence from Chapter Eight is that almost anyone can learn to fly, and that a great variety of people do. Being wealthy is not really necessary nor does it assure an interest in continued recreational flying once begun, though it does help. So probably a wealthy county, other factors equal, would have a greater potential market for recreational flying than a poor county. In the sample of seven, the wealthier counties did have more registered planes per capita. The range of demands for airtransport either for commercial or recreational use were

not heavy at any of the county airports in our sample. It was only when efforts were made to "sell" the potential uses of flying for business or pleasure that activity reached a level which was economically viable, if not satisfying. These activities, then, required additional financial and personal resources from an enterprising entrepreneur and/or the local governmental body overseeing this public facility.

Resources in Airport Development

The availability of air transport capacity implies that resources have been mobilized to meet the demand. Resources may be divided into three categories--physical resources (usually expressed in monetary terms), human skills, and political support. The physical resources needed for the establishment of any airport included land, construction materials, technical equipment, and payments for work performed. The skills needed were several--among them flying, persuasive, organizational and construction skills. The political resources included both public and private support. We shall discuss the principal organizational loci of these resources as they appeared to have affected air transport capacity in our counties.

The Fixed-Base Operator. As was discussed in some detail in Chapter Five, a fixed base operator is that individual or company located at an airport and offering air-related services to flyers. Both a million-dollar air freight service based at a regional airport or a part-time caretaker at a sod strip can be fixed-base operators. The FBO's at the Ohio county airports tended to be single individuals or small companies, and most of them offered a jack-of-all-trades assortment of services: instruction, charter, sales, rental, fuel, and repairs. Because the FBO is the principal avenue of access to the transportation technology for its users, much depends on his skill in making the technology relevant, useful, and accessible to others in these communities.

An FBO would ordinarily measure his own success in terms of profit (or possibly pleasure). Outsiders usually evaluated it in terms of the growth and maintenance of available capacity and the level of usage

attained. We shall use the outsider's perspective here, though cognizant that an FBO who does not succeed by his own measure will probably not stay around to succeed by someone else's. Based on our observations and interviews, what skills did we find necessary for success as an FBO? The following list roughly indicates the requisite skills for success as an airport manager.

--Aviation skills. Rather obviously for a small operation, the FBO must be a good pilot who knows his planes and how to use them even in difficult flying conditions.

--Management Skills. The FBO must be able to recruit others with contributory skills and hold them. He should be strongly motivated, for given the extraordinary demand on his own time, how reliable he is will depend on that motivation. He must be able to cope with uncertainty--able to define and achieve his own objectives in a market that is not clearly defined and in a business that provides only on-the-job training.

--Personal Skills. The FBO must be able to work with a wide variety of persons: school children on field trips, busy executives, local politicians, and others. He must be a persuasive salesman and able to discern the wishes of others.

One suspects that anyone who had all of those attributes in full measure would have gone on to better things a long time ago, and indeed the operators we observed were rather more like ordinary people than the ideal businessman we have just described. But those attributes are important, for variations in them observed among operators in different counties and successive operators in the same county, did make significant differences in the status of the airtransport capacity. Some examples suffice to make the point.

One day a business plane circled over one of the county airports for an hour, trying to contact the manager below on the radio. The manager, unfortunately, had gone to bury a dead animal, which fact did not mollify the delayed executives.

On a day we visited another airport, a class of schoolchildren came on a field trip to the airport. The FBO, who knew that a good

word from the children would help ingratiate his operation to their parents took them aloft and treated them, and us, to a few takeoffs and landings. A good word from visiting researchers can't hurt, either. His predecessor had been let go because of public dissatisfaction over his manner toward visiting businessmen and his disagreeableness to flight students. Yet another manager makes it very clear, by direct and indirect means, that recreational flyers are much less important to him than his corporate customers.

The resources available to a fixed-base operator are usually limited to his own capital reserves, his current income, and whatever subsidies are given him by public or private groups. The resources supplied by others are discussed elsewhere in this section. As for capital reserves, the seven FBO's interviewed in our survey varied. Those in Vinton, Hardin, and Jackson counties had virtually none--either they did not own a plane or they shared ownership of a plane. Those in Fayette and Knox had by our accounting medium reserves--enough, say, to make buying a twin-engine plane thinkable but not easy. In Williams and in Holmes, where the airport operations were part of larger corporate enterprises, larger reserves were accessible.

We observed a variety of organizational formats and contractual relations with the county among the FBO's in rural Ohio, but four rough types, arranged by the degree to which they denote organizational support for the operation, may be discerned: a) a local corporation that manages the airport as well as its manufacturing activities; b) an entrepreneur who manages one or more airports as his full-time occupation, and who may have a few employees, c) a caretaker employed by the county to keep up the minimum appearances of operation and maintenance, and d) no formal full-time operation at all, in which cases some person from the community usually acts informally as a part-time manager. These organizational arrangements--or lack of them--differ in the resources and attention FBO's can bring to the job, as well as the range of skills likely to be contributed. For these airports, the more organized and staffed they are, the better the air transport service in general.

With regard to political support for the airport, the FBO generally has no independent base from which he can create support for the airport operation. His prominence and his influence generally extend only to airport matters. The only exceptions to this have been cases in which well-known citizens have stepped in temporarily to act as airport manager.

The FBO, more than the plane flights themselves, is the visible social symbol of what the airport is and what its future holds. Although for any one airport situation there are limits to what an FBO could do, those limits do not usually force either success or failure upon the airport. It is the FBO who makes that final determination, he is one of the most important variables in the airport situation.

It was therefore surprising to find how unstructured the training and location of operators was. Only the most rudimentary sorts of steps were taken by either the state or the counties to find qualified persons for these positions.

The County Government. The commissioners and the other officials of the county must have sufficient skills to assure that the airport and the rest of the county stay in a healthy balance with one another. This balancing act requires political judgments, technical expertise, organizational experience, and attention to detail. The county government must also stand ready to supply physical resources to the airport.

The characteristic political skill of county commissioners in rural counties such as the ones we surveyed is the art of seeking consensus before acting. The commissioners act as men in the middle, trying to balance between the liberal townsmen and the conservative farmers or, if the alignments are a bit different, between those who think growth is progress and those who do not.⁷ In practice the initiation of new programs is left to others, usually the informal town leaders, and the commissioners resist acting until there is a clear consensus. Theirs is a low-profile approach, but it is not therefore to be faulted. It has meant that while none of the commissioners in the counties we visited had been active in pushing the airport development, virtually none of them were still opposed to their airports. (The principal exception was found in Jackson County with its history of troubled management.)

In the other areas--organizational experience, technical expertise, and attention to detail--the talents of county commissioners in the face of a technological project were less clear. In most cases, we gathered, the problem was addressed by the appointment of various boards or authorities. In five of our seven counties, an Airport Authority had been established by the county government to oversee for it the operation of the airport. The members of the Airport Authorities were generally prominent citizens who were also active flyers, but there were a few non-flying businessmen on the Authorities and a few citizens attracted by what they saw as a new height of public prominence for themselves.

The evidence on the actual usefulness of Airport Authorities is mixed. In many of the particular case decisions that we learned of, it appeared to us that the Airport Authorities played only minor roles. And there were arguments against their use: One airport manager felt the board was merely blocking his access to the county government; and the commissioners of a county without an Airport Authority felt that the 44 independent boards they had were quite enough.

The arguments in favor of an Airport Authority were the ones that might be expected: that it served to relieve the county commissioners of administrative detail as well as protect them from hot political issues, and that it brought management expertise and political support to airport problems that the commissioners might otherwise ignore. Aviation officials in other states, such as California, expressed similar arguments in conversations with us.

The physical resources contributed by the counties varied. Hardin County, for example, made no financial contribution to the creation of the capacity, although it did contribute to its maintenance. Holmes and Knox Counties made contributions of several tens of thousands of dollars, primarily for purchasing land. The largest county contribution was the involuntary one by Jackson county.

Of particular importance was the continuing financial support of the FBO through his contract with the county. Each county had to take its own political stance as to the appropriate subsidy level, but the importance of the FBO makes this level of support significant as well.

The State. The resources, skills, and political support brought to bear on the airport operations by the state government are well discussed in Chapter Four. Only a few comments, from the county level, need be added here.

It was not clear that the state financial support to three of these particular counties made a crucial financial difference to potential airport development or served as the necessary trigger for other resource contribution to that development. For Knox, Williams, and Hardin counties, the difference made was a welcome increment, but was not absolutely essential. Each of these counties would very likely have developed a fairly good general aviation airport without the state aid. For the four other counties, at the time the state aid was offered, the state money probably was the essential element without which the rest would not have happened.

The state decision to distribute \$100,000 to 50 counties instead of, say, \$200,000 to 25 counties had major consequences at the county level, whatever its motivations at the state level, and for two reasons. First, presumably a much better, or at least bigger, airport could have been built with more money in each case, with different consequences for each of the three phases described in the first part of this chapter. Second, there was some complaint at the county level that the state had built too many airports--that there was insufficient demand for the number of airports built. The argument here is obviously that a given capacity will not be viable unless demand for it is above a certain level; fixed costs must be made up. Whether fewer but larger airports would have solved the problems of ongoing airport operations is not clear, since the minimum necessary demand for each would also have been greater. It is probably safe to say that if the state had built only 20 airports of the same size they chose to build 50 of, the twenty would all be doing very well. Of course, this strategic choice would have plunged the airport program into a dense political thicket during the gestation period of its legislative history. The degree to which this move would have jeopardized the whole program at its outset remains a significant political question, though untestable.

The skills of the state's Division of Aviation were most evident at the county level in that so much airport *was* built for so little money in so many places, and that so many people were persuaded of the worth of the program. That skills of persuasion were needed indicates, perhaps, that the DOA's political support did not of itself carry great weight locally. Indeed, the interview data show that the state did little to increase the political legitimacy of the airports, beyond brief visits by Governor Rhodes to airport dedications and fly-ins just *after* completion.

The Rest of the Population. The creation, maintenance, and use of air transport capacity requires at least some skill on the part of all the people who support it or use it. Pilots must know how to handle aircraft, lawyers must know how to write the operator's contract, businessmen must know how to organize their shipments, and so on. The aggregate level of skills in a population is very hard to define precisely, but among the seven counties the upper and lower limits seemed easy to identify. We found two counties that seemed much more organizationally minded, much more attuned to the ways of the complex urban world, than the others. We also found two counties that were quite rural, whose people were not very accustomed to organizational roles. The other counties were somewhere in between.

Particular skills and experience pertaining to airports and flying was an important component of this aggregate variable. All of the counties had had some kind of experience or other with aviation for decades, with Williams and Vinton representing by far the most and the least, respectively. In the years just prior to the state program, three counties--Williams, Knox, and Hardin--had independently undertaken their own efforts to build a new airport. Holmes had considered the matter but the necessary bond issue had not passed; Jackson, Fayette, and Vinton had not done so much.

As might be expected, the three counties that had made recent efforts on their own were also among the more developed of the seven counties. This raises the possibility that business attracts flying, rather than the other way around,⁸ and it brings us to the matter of physical resources contributed from private groups.

Private groups willing and able to contribute resources to the airport development were welcome helps--not only because the state and county amounts were insufficient to do the job, but also because the state and county sources could not act with equal speed or flexibility. Contributions from the public could be and were raised, but these efforts are time consuming and generally not amenable to repetition. Small contributions of time and money were available from pilots' associations. But there also had to be large donations from individual or corporate sources. The Hardin airport had no county support and no FBO, without its major corporate contributor it probably would have faltered badly. In Jackson, the county was stuck with a huge bill in part because no corporate donors came through with significant contributions.

Corporate financial contributions to airport construction were not used to garner the public's political support of the airport project, but corporate *use* of the airport was. In many interviews the fact of corporate usage was given as the principal positive attribute of the airport. Recreational usage, not surprisingly, was not seen as a basis for political legitimacy.

The principal sources of political support from non-governmental areas were the newspapers and influential private citizens. In Fayette County and Knox County, regular newspaper columns about airport activities did much to generate support. Both persons closely involved with the airport and members of the public reflected the importance of that support in their interviews.

Concluding Interpretation: Conditions of Diffusion Without Disruptive Impact

In reviewing this catalogue of potential and actual effects of the Ohio County Airport Program, what is most striking is the apparently very limited impact of so wide a diffusion of the technology, i.e., airport facilities and minimum operations, throughout rural Ohio. In a sense what this study represents, as distinguished from most studies of technology and social change, is an examination of a technological development process which the adaptive capacities of a social system have

been able to adjust, absorb, and integrate within its usual patterns of activities. It has been a study of a program which achieved its minimum objectives with minimum disruption of the social fabric of the receiving communities, and perhaps at minimum cost. This is no mean accomplishment!

The key factors in this smooth diffusion seem to have been

- 1) An implementing organization small enough to sustain highly flexible internal arrangements throughout the construction phases. This flexibility allowed opportunities both at the community and at the legislative/executive levels to be taken up quickly and with a high degree of sensitivity to variations in local conditions.

- 2) An implementation strategy which encouraged the distribution of state resources in accord with local political values and in amounts sufficiently small to limit the sheer size of each technological intervention. Governance mechanisms were developed in a way which promoted local self-regulation of the new operations and thus reduced the potential for community opposition.

The manner of distribution--provision for limited developments to each county and for local self-regulation--has allowed for considerable variation in the degree to which the potential utilities of new, improved airtransport capacities have been exploited. Thus, the very qualities which *produced* a successful implementation process, have acted to *inhibit* the rapid, potentially somewhat disruptive, development of airtransport-associated industrial activities. In a sense, the varied characteristics of the local communities which have led to little or clearly contained developments around the airport have been allowed to shape that development without further state-level intervention. Thus local conditions and values have moderated the potential rapid realization of industrial growth goals while allowing for the achievement of those goals which have the least upsetting effect on the communities.

NOTES

¹There is an enormous literature on the subjects of leadership and power in small communities as well as cities. See, for example, Nelson W. Polsby, *Community Power and Political Theory* (New Haven: Yale University Press, 1963); Arthur J. Vidich and Joseph Bensman, *Small Town in Mass Society* (Princeton: Princeton University Press, 1968); Robert A. Dahl, *Who Governs?* (New Haven: Yale University Press, 1961); and Floyd Hunter, *Community Power Structure* (Chapel Hill, North Carolina: University of North Carolina Press, 1953). These are only a few of the most noted works in the field. For a detailed bibliography, consult Walter E. Clark, *Community Power and Decision-Making: A Selective Bibliography*, mimeo, Council on Planning Librarians Exchange Bibliography 234, November, 1971.

²John Scalea and Robert Simpson, "A Critical Analysis of the Economic Impact of New Airports in Ohio," F. T. L. Technical Memorandum 73-5 (Cambridge, Massachusetts: Massachusetts Institute of Technology Flight Technology Laboratory, March 29, 1973).

³Such symbolism is found to attach even to the airports in larger cities, and in other transportation modes as well. See IGS 1972 Report to NASA, Ch. 2.

⁴An interesting reaction came from a few of the old-time flyers: that the new airports, paved for the bigger, faster planes, had taken all the fun out of flying. The old days seem always to be better.

⁵Among the case studies cited there, note especially Norman T. Moline, "Mobility and the Small Town" 1900-1930, University of Chicago Department of Geography Research Paper No. 132 (Chicago: University of Chicago Department of Geography, 1971).

⁶IGS, 1972 Report to NASA, Ch. 2.

⁷See, for example, Vidich and Bensman, op. cit., Chs. 5, 6, and 10. One of the agricultural agents we spoke with also volunteered this view.

⁸A similar conclusion was reached in a major study of Soviet transportation experiences: "[T]ransport investment is a concomitant of, not a precondition for, economic development....[T]he Western concept of infrastructure as a necessary precursor of economic expansion does not square well with Soviet experience." From Hollan Hunter, *The Soviet Transport Experience* (Washington, D.C.: The Brookings Institution, 1968), pp. 123 and 129.

PART IV

OHIO AND BEYOND: SOME IMPLICATIONS FOR THE SOCIAL ASSESSMENT OF TECHNOLOGY

This study has been concerned with refining a conception of technology as a social process and "testing" the feasibility of using that conception to enhance the quality of social assessments of technology. Our aim has been to show that such a conception is amenable to social research and that improved technology assessment could result if studies like the one reported here were included in the assessment process. The Ohio County Airport Program, one of several projects Ohio undertook in the mid-sixties in its pursuit of economic growth, served as the object of our "feasibility" study. The field portions of that study are reported and analyzed in the larger context in Parts II and III.

In Part IV we attempt to move further beyond the details of the particular public program. Chapter Ten includes our reflections on the "success" of both the Ohio County Airport Program and the process used here in conducting our "feasibility" study. The evaluations presented in Chapter Ten are informal, presented more in the spirit of discussion for further learning rather than as conclusive "assessments." Chapter Eleven concludes the body of this report with a discussion of the implications this study holds out for technology assessment generally. A methodological Appendix rounds out the technical materials which were important instruments in the field portions of this project.

CHAPTER TEN

THE OHIO COUNTY AIRPORT PROGRAM AND THE PROCESS OF SOCIAL ASSESSMENT· SUCCESS AT THE GRASS ROOTS

This chapter will attempt to weigh the "success" achieved by the Ohio County Airport Program and to review the process our research team used to determine that program's effects on some of the communities to which airports were "delivered." While we have not conducted a systematic evaluation either of this Program or of our research strategy, informal reflections on their respective results "at the grass roots" is in order.¹

During an eight year period over sixty small county airports were built or significantly improved throughout the rural counties of Ohio at an initial cost to the State of about \$100,000 per airport.² This diffusion of technology was managed by a small group of five to ten members of the Division of Aviation working, in part, through citizen groups and local county officials. As more and more local communities were drawn into the development, the skeleton of a quite extensive airtransport network emerged. On the face of it, Ohio's Division of Aviation can point with considerable pride to this accomplishment. But public policies administering technological developments cannot be counted successful by virtue of sheer physical, technical development alone. Technical development is always or should be instrumental for other more clearly *public* purposes. The Ohio County Airport Program is no exception.

The objectives of the Program included those goals closely associated with the primary activity of flying. They were to provide facilities which would increase the overall *safety of*

general aviation in the state, encourage the *diversion of air traffic* from Ohio's regional airports and from its several large trunkline air terminals, and greatly expand the network of potential landing sites *servicing corporate and recreational flying*. These objectives might have been sufficient had the public been heavily engaged in flying and clamoring for more services. But that was not the case in Ohio, and the Division of Aviation saw itself involved not only in promoting general aviation, but swept up in a larger effort which could have much broader social consequences.

Both the Division and Governor Rhodes' administration saw the airport program as part of a larger economic development strategy designed to invigorate Ohio's stagnating economy. As such, several less directly aviation-related objectives were held for the Program. *Economic growth*, the influx of new industrial plants and labor force to the communities receiving airports, was perhaps the most hoped for result of the Program. It was intended that in turn this influx would assist in reversing the trend toward urban population concentration and *disperse more population into rural areas*. Both Governor Rhodes and Director Crabtree realized that able, experienced local leadership is one crucial element in economic stimulation. Accordingly, the corrolary objective of nurturing new community leadership capabilities and increased community involvement was an important aim of the Program. This objective was kept clearly in mind when the particular conditions for county participation were established.

Such were the manifest goals of the airport program--the goals which provide part of the context of evaluation. There were other, less obvious goals, of course, particularly those held by the Division of Aviation. Perhaps the most salient among the latter were organizational vitality and fitness in the battle for political survival. Only with these assured could the relatively high degree of organizational autonomy which the Division had achieved in the past be maintained.

PERSPECTIVES AND PARAMETERS FOR MEASURING
"SUCCESS AT THE GRASS ROOTS"

A judgment about the success of a public policy is influenced by the particular perspective of the evaluator. These perspectives can vary a good deal. In the case of the Ohio County Airport Program, they range from the quite short term *technical/operational* view of those concerned with construction and operationalization of the airport facility to the much more macroscopic perspectives of Ohio's *political leadership* and its *economic sector*. In between are the fairly circumscribed perceptions of the *"receiving" counties and communities*, and importantly, the view held by *implementing agency* itself, the Division of Aviation. The Program's successes will be evaluated variously from each vantage point, for priorities differ, as do perceptions of allowable costs and degrees of difficulty.

The perspectives of the various parties to the development of airtransport capacities in rural Ohio varied across at least four different dimensions. The first such dimension--*the scope of intended change*--runs from the relatively limited technical goals of getting the airports in place and operating at least at a minimum level of service to the much more sweeping objectives of economic development and population dispersion. This broadness of scope is closely paralleled by varied judgments on the second dimension--*the time expectation for goal accomplishment*. An evaluator's determination of the appropriate swiftness which might reasonably be expected of a successful program is dependent upon his beliefs about the technical difficulty of the mission, about the character of the political and economic process, and about the legitimate pace at which social behavior may be changed. We have come to expect quite rapid changes in the technical phases of technological developments--airports should be built relatively quickly. Thus some advances in air safety and traffic diversion should follow soon. But changes effected by new recreational or corporate uses of airtransport are likely to come a good deal more slowly. It

takes time for people to discover what improved air transportation capacity offers; and, even if they come to believe it could be of service to them, time to adjust their own activities accordingly. The goals of substantial economic growth and population redistribution are likely to require a very considerable period of time before substantial system change is evident. Indeed, it may never be evident, or even if it is, the impact of a relatively small intervention--such as a \$100,000 airport facility--may be very difficult to gauge among the many other factors related to such large scale change.

The third dimension is *the relative impact of the project on the public purse*--the amount of funds invested and the efficiency of their use. The \$100,000 grant allocated to each county for its airport may or may not have been spent efficiently. It is clear, however, that the total amount of funds for each airport was dramatically lower than the FAA's appraisal of the sum necessary for federally funded airports of similar capacity.

The fourth dimension, finally, is particularly important for a social assessment of technology, and that is *the scope of disruption of receiving communities' local cultural values and social structure*, of which the innovation and its deployment has been the agent. Obviously at one end of this dimension would be the situation in which a technical development is implemented well within the local community's adaptive capacities, so that there is but little noticable social disruption. At the other extreme is the situation in which a technological development in effect overwhelms and destroys the established character of social life, inundating the local community with a great many newcomers--"invaders" with very different life styles and social values. While observers may be able to reach consensus on the degree to which disruption has occurred, the value they put on such change may vary considerably. If a primary value is placed on maintaining the calm and equanimity of a community or society then disruption is obviously to be avoided. If, however, the longer term changes prompted by the technical development are believed to be beneficial and to outweigh the harm done to existing patterns of social life, then keeping social change minimal is not a mark of success.

The Relativity of Success

Judgments about the success or failure of any public policy program are based on estimates of the consequences of actions taken and the importance an evaluator assigns to these consequences. In the case of the airport program we begin with the fact of the physical construction of the airport facilities and the establishment of an operating management. (*For our purposes*, there was no significant variation in the degree of construction adequacy, as we have discussed above, however the vigor of the various FBO operations differed considerably.)

From the technical/operational perspective, the fact that the airport facilities existed and were operational--immediately contributing to air safety and available for air traffic diversion from larger airports--signals considerable success. Likewise, simply providing so many new landing sites with minimum services was a large advance in improving service for recreational flyers--many more adequate places to land and refuel became available. But the increase in technical services to corporate aviation was somewhat less dramatic. The minimum facilities of the new airports went only a moderate distance to satisfy the more sophisticated all-weather landing capabilities required for reliable airtransport. Finally, the sweeping social and economic objectives of the airport program had little direct connection to technical/operational evaluation.

The success of the airport program, viewed from the perspectives of the communities themselves, takes on a somewhat different cast. For the most part airport developments have not been the source of problems of disruption in these communities, but neither have they been the cause of much increase in valued activity. Thus the Program was successful if it is to be judged on the basis of implementation with little attending disruption. But this is only a minimal kind of success. In most cases, the airport cost the county something--donated land, voluntary contributions, and, occasionally, relatively significant sums of public monies. To what degree can the airports be judged successful in terms of more

positive goals? Certainly improved safety has been provided for local flyers. But their numbers are small and, in the face of an already relatively safe situation, the new airport represents only a small increment of improvement to the community. The diversion of air traffic from other airports is almost irrelevant to the communities in any direct sense. The airports do provide a service to local corporate and business flyers, but, again, this has not been a very extensive activity. In the most direct sense recreational flyers have profited the most. More services are clearly provided to them, offering some interesting diversions for nonflyers as well. Local leadership opportunities have been enhanced by the airport program only a little, but it has provided another activity to be tended which can afford some training grounds for leadership development. In terms of more general economic growth, there is little evidence that the airports have had much to do with what little there has been in these communities. While a small increment of economic activity has been developed through FBO management, this does not represent economic growth. Finally, the matter of population shift is only of concern to these communities if it happens and subsequently results in disruptive effects within the rural culture they value. These communities do not want such a movement. In this sense, the fact that no influx has occurred might be judged as a positive result, but it is quite irrelevant to the community vis-à-vis the airport development.

The matter of success or failure of the Program is most variegated from the vantage of the Division of Aviation itself. The Division has the clearest sense of the difficulties involved in carrying out and nurturing the Program development, and the full range of goals are relevant to its judgment about its own activities. The Division also has the continuing concern of any subordinate organization for its relationships with its superordinate agencies, in this case the Ohio's Executive and Legislature. Finally, the Division's perspective is complicated by the understandable tendency to appropriate to itself the perspective of technical accomplishment and operational development. In effect, the Division wanted to think of itself as highly successful technically and as increasingly successful in terms of all the other objectives attached to its airport program.

There seems to be little question of the Division's technical success. Essentially Chapter Four tells that story. It is a remarkable one to have been acted out by such a small company of men who were long on dedication and short on experience. But how might the Division rate its Program in terms of the full range of its objectives?³ Clearly, it can claim substantial success in increasing facilities which enhance air safety and general service to recreational flyers. These improvements were almost immediate and provided a direct benefit to the Division's most articulate clientele. And, at the time of this study, a moderate decline in small plane landings at the larger regional and trunkline airports already was evident. Air traffic diversion had begun, with traffic congestion apparently preventable for some time. Improved service to corporate aviation had been made available throughout rural Ohio, though no dramatic increases in business aviation use of the smaller airports had been made as yet. There were, however, enough stories of such use to allow the Division to believe it to be on the increase and to expect further increase in the future. (Nor has the Division been content to leave this matter wholly to the fates. The next mini-phase of the continuing airport development activities includes seeking funds from the FAA for systematic improvement of airport all-weather capabilities, especially instrument landing systems, improved radio communication and more sophisticated navigation aids. Such additions would "open" the county airports to much more regular corporate use.)

With regard to the longer term social and economic changes, the Division has taken a somewhat different view--one consistent with what we ourselves observed in the rural communities. Its hopes for stimulating new and/or improved local leadership capabilities has not been realized to anywhere near the extent they had hoped for, nor has there been the degree of industrial growth they had anticipated. Certainly it is much too soon to tell the degree to which population redistribution will occur. The Division, particularly its Director Norman Crabtree, has a kind of faith in the future and believes the Program has contributed an enabling element to that vision. There are many factors which enhance

or impede leadership growth, economic development and movements of population. Various forms of technical development can contribute to these, though often in mysterious proportion. The airports are in place and in the hands of local institutions. While airport developments certainly are not the only stimulus to social development, they surely have the potential to assist such development. In this sense, then, even in terms of the more remote and multifaceted social goals, the Division judges the simple fact of airport development to be a success.

Finally, the Division's work with the Program can be evaluated in terms more directly related to the agency's relative bureaucratic strength. The Division, small and relatively unnoticed among its giant public transportation neighbors, went into the Program as an agency with little visibility in the State. It has emerged as a much more prominent agency, making good on its bet with the Legislature and surviving in good style a gauntlet of its own devising. It won considerable good will around the State. The effect has been that it has become much stronger, gathering to itself the aviation activities of the State police and achieving a kind of organizational parity with the much larger Division of Highways during a recent reorganization of the State Department of Transportation. In this sense of organizational "fitness for the future," it attained a remarkable degree of success.⁴

From the more general *political perspective* taken by Ohio's public leaders, the Program's success is likely to be seen in a more muted way than is afforded by the Division of Aviation's vantage. Again, the full range of criteria are relevant, this time set within the context of the costs of the improvements and their relationship to the much larger effort to stimulate the Ohio economy. Perhaps the most important aspect of this political judgment is that the total sum of monies initially spent on these airports, \$5 million, was quite small compared to the total 200 million dollar bond issue. It obtained over fifty airports, distributed across as many counties. Set against the very large sums spent by the FAA for its airport developments, this feat was remarkable, and the Program garnered substantial local political support. Furthermore, moderate improvements in air safety, and air traffic diversion soon

followed. While the airports did not prove to be a great service to corporations, they symbolized legislative and executive concern for business development. Moreover, it was not impolitic that the State's vocal contingent of recreational flyers gained substantial advantage from them. Such effects occurred entirely within the context of local control and without increasing the tax burden directly. Thus a number of political values were addressed, apparently with little or no direct loss to anyone.

It is true that some Program goals were not advanced very far. Local community leadership incentives may have been stirred somewhat, but there has been little if any significant economic growth, and population dispersion is still some way off. But these kinds of objectives--being long term--usually have little salience for legislators in any event. Thus, for a number of reasons, the airport program and the way the Division of Aviation carried it out accrued some political gain, with little if any immediate political losses. Even if the Program itself was a small part of the total development strategy for the State, it could be pointed to as one of the few programs which had been accomplished without an expanding bureaucracy, which honored the value of local control, and which seemed exemplary in its efficient use of public funds. In the context of most other public programs underway at the time or in the memories of most of Ohio's leaders, the airport program was a success albeit in an area which had relatively low salience for the solution of more overriding social and economic problems. Given the general political picture, however, governmental "success" at any level was welcomed.

The final perspective projected is that in which *economic concerns* predominate. Viewed from this stance, the Ohio County Airport Program draws rather glum reviews. In terms of our scheme, neither air safety nor air traffic diversion are very relevant in judgments about the economic significance of the Program. The most directly interesting goals must be the degree of economic stimulus provided, in various ways, by an airport's service to corporate aviation and to the recreational flying industry. As we have repeatedly suggested, the economic contributions of these

airport-related activities were rather limited. Even though there was some increase in corporate use and a sizeable increase in recreational flying, no significant contributions to local economies could be confidently attributed to these activities. Finally, the economic perspective can discover little advance toward the longer range goals of community leadership growth, more general economic growth, and population dispersion. The changes that did occur were of such limited magnitude as to be discounted as indications of economic vigor. But here an interesting note should be inserted.

Among the more provocative aspects of this study, and so far unreported, were some indications that these communities were already relatively fully developed *in terms of their present sizes*. These indications necessarily came subjectively, pulled together after we returned from the field. However that may be, the following "indicators of development" seemed apparent in each community we visited. First, the local labor force, excepting the hard core unemployables, was nearly used up. Second, the capacities of local water and sewer facilities were almost completely absorbed. Third, there was a shortage of local housing, especially among the middle and upper middle income classifications. These conditions suggest that, whatever had happened to the State's economic development, the local economic capacities of these communities were almost fully occupied. Thus, economic growth would have required an expanded labor force, "imported from outside," and further substantial public and private investments in basic services and facilities. In the minds of a number of community leaders such changes to allow for further growth might threaten some of the most cherished aspects of rural life. They did not seem well disposed toward public investments to facilitate a potentially radical change in their valued style of living.

Our "success estimates" are summarized in Figure 10-1.⁵ What can be made of the pattern that emerges? Perhaps the most obvious point, beyond noticing the wide variation in judgments, is that socio-economic

FIGURE 10-1

SUCCESS TABLE FOR THE OHIO
COUNTY AIRPORT PROGRAM

DEGREE OF SUCCESS* DISCERNABLE FROM VARIOUS PERSPECTIVES

	<u>Program Objective</u>	<u>Technical- operational</u>	<u>Community perspective</u>	<u>Program's implementing agency</u>	<u>State's Political leadership</u>	<u>Economic sector</u>	<u>AV</u>
Aviation Oriented	Air Safety	Major	Minimal	Major	Moderate	----	2 25
	Traffic Diversion	Moderate	----	Moderate	Moderate	----	2 0
	Service to recreational flyers	Major	Moderate	Major	Moderate	Minimal	2 2
	Service to business	Minimal	Minimal	Moderate	Moderate	Minimal	1 6
Social, Economic	Community leadership	----	Minimal	Minimal	Minimal	Not any	75
	Economic growth	----	Not any	Minimal	Not any	Not any	0
	Population dispersion	----	----	Not any	Not any	Not any	0
	Average	2 3	1 0	1.7	4	1 3	

* Drawn from a 4-point scale Major = 3, Moderate = 2, Minimal = 1, Not Any = 0

objectives--those which are likely to involve a greatly expanded set of actors over a longer time period--draw few positive evaluations. The first four objectives could be pursued by an aviation-oriented agency without taking on the obligations of affecting the wider society in specific ways. In a sense, the Division need not have been expected, indeed should not have been expected, to be able to be effective in improving community leadership capacities, increasing the economic vigor of a community or stimulating population dispersion. While the technical and organizational possibilities within the Division's capacities and jurisdiction, if properly carried out, might indeed facilitate these systemic changes, there is little reason to suppose that they alone could cause them.

It also seems clear that had our exploration of "success at the grass roots" remained only within the ambit of those objectives most usually associated with a technically based aviation agency, an overall evaluation of the Division of Aviation and the County Airport Program would have come off a bit better than as inference in Figure 10-1. In a sense, the Division put itself into a somewhat perilous position by taking on a much broader set of goals than it needed to. In taking up, quite self-consciously, objectives of leadership development, economic growth and population dispersion, conditions which are difficult to improve through any public policy, the Division came close to committing the policy sin of expressing a sense of social vision about its technological activities. By doing so, the Division opened itself to charges of unrealistic expectations for itself and the communities to which airports were "sold" (more properly "given to"). Thus in the context of an unusually expanded range of goals, the Division subjected itself to the likelihood of less positive overall judgment than if it had stuck more closely to home, as it were, and limited its expressed promise of social benefit.⁶

A final point remains--the larger issue of whether the Division of Aviation should have been involved in airport development at all. This question stems from a concern for the opportunity costs of investing over 5 million dollars in some sixty landing strips. This is a

matter of political choice, as well as a matter of fact about whether these airports would forward social developments as well as provide service to a segment of the flying public. The choice to include airport development as part of a grand strategy was made by Governor Rhodes and the Ohio Legislature, obviously with the enthusiastic encouragement of Norman Crabtree. If Crabtree had not promoted the Program proposal, he would have been considered remiss as the Director of the Division of Aviation. After all it was his job to enhance Ohio's aviation service as much as he was able. Hence it is difficult to fault the Division and its County Airport Program on the grounds that the job was done too well. Given the pattern of rewards and incentives, as well as the enthusiastic convictions of the men of the Division, could we have expected them to have slackened their efforts or to have become less energetic in pursuit of their legislated mission? One of the remarkable aspects of the Program in fact was that so much energy was poured into the enterprise for such a relatively long period of time. Whatever the larger questions of opportunity costs--questions which could not sensibly have been resolved within the Division of Aviation in any event--the Division's behavior was an altogether uncharacteristic response for a government agency.

But it has not been our purpose, in this study, to engage in "policy evaluation," that is, to analyze systematically the wisdom of initiating and carrying out the Ohio County Airport Program. Rather our intent has been to explore the feasibility of a particular perspective toward technology as social activity bound up with other elements of a larger social system. We have done so with an eye to improving the analysis undergirding technology assessment. We turn now to a review of the research process.

REFLECTIONS ON THE PROCESS OF "DISCOVERING SOCIAL IMPACTS"

Several general criteria should be applied in "evaluating" the process which grew out of our efforts: the character and appropriateness of conceptual development and methodological techniques applied to the

field situation, the character of the process of taking these concepts "into the field", and finally, the character of the substantive insights derived from the enterprise. It would be well to remember that there were sufficient funds for about thirty man months of work on the Ohio County Airport Program study, split about evenly between the research design-data gathering stages and the analytical and write-up portions of our assessment effort.⁷ Chapter Nine has drawn together specific findings immediately related to the county airports of Ohio. The concluding chapter will discuss their more general substantive implications and potential applications. The remainder of the present chapter will focus on conceptual and methodological points intrinsic to the process of our field research.

At the outset of this project, the situation facing the research team was similar to that confronted by researchers in most social science field research and, at present, in *all* technology assessment studies. There was very little in the existing literature to assist us in predicting the kinds of economic and/or social consequences of transportation development for relatively small communities. This remains the case for most, perhaps all, types of technologies. In effect, any group would have to be "flying blind," as it were, if it depended solely upon the existing literature for its research design. What available information there was in government reports or statistical data from U.S. Census and State of Ohio sources was much too grossly aggregated to provide insights into the effects of any transportation technology on small rural communities.⁸

The first step in seeking to fill in the gap was to explicate the general notions of "technology" in such a way that they could be related to social behavior. Such a conceptualization was to be the basis for a process of successive approximation in increasing the accuracy of descriptions about the relationships between a particular technology -- air transportation and airports--and its effects on social experience. These conceptual refinements had to be made in a manner which allowed the team to construct questionnaires and interview protocol for systematic interviewing of the people who were actually participants in the technical development and the use of airports. These people were in

effect almost the only source of data. In Chapters One and Two above the progression from general conceptual notions to the specific questions is unfolded. Recall the several stages of this development. First, specific questions about all the counties receiving airports were developed on the basis of our general notions, then these were put to Director Crabtree. Next a set of hypotheses and questions were derived on the basis of the new information from Crabtree and our initial reconnaissance in Columbus of Ohio's rural sub-cultures. Finally, our initial conceptualization was revised after we explored the first sample community.⁹ We leave it to the reader to judge the effectiveness of this process. Suffice it to say that the first two iterations were required before our conceptualizations were refined enough to give us an intuitive confidence in their utility. Our general methodological process is described in Chapter Two along with the informal hypotheses which in part guided our field work. There is no need to recapitulate the process here. Rather, those aspects of the field research which were of particular value to the team in developing descriptive and substantive confidence will be noted, along with the "surprises" that awaited us as we ventured into the field.

Successive Approximation in Exploring the Grass Roots

It was apparent almost from the outset that the usual mode of conducting technical feasibility studies and, more recently, technology assessments--depending on existing literature and interviews with the people who implement technical programs and operate related facilities would not do. The literature is silent about what is most interesting, and it was certain that those directly involved with technological implementation and operation would have a partial and hence necessarily biased view of the overall situation. Hence the research team was in a position similar to that of most policy analysts and students of public programs insofar as it lacked the intuitive knowledge of those deeply involved with general aviation and the operation of airports--the technical heart of the program to be studied. Hence we had simultaneously to become acquainted with the social aspects of airtransport technology and to ferret out the relationships between its technical development--more specifically, the

construction of rural airports--and the surrounding community. There were four particular steps in the overall process already described in Chapter Two and in part in Chapter Six, which proved invaluable in accomplishing those two methodological objectives: an informal, on-site acquaintance of airport operations and the workings of the Division of Aviation, a subjective reconnaissance of a larger number of communities than that finally selected for the study sample; an interdisciplinary team approach to community study, and the self-conscious development of cross-perceptions and confirming data from multiple sources.¹⁰

It was clear that an informal acquaintance with the sociological aspects of airport operations was essential, especially in the absence of orienting literature. Our initial entry into Ohio included casual, often incognito, visits to small airports in order to get a "feel" of the social activities associated with them. These visits sometimes amounted to no more than quiet observation, but most often attempts were made to talk informally with the airport manager. This exercise proved important for two reasons. First, it sharply reduced the "strangeness" of the general aviation sub-culture and increased the team's confidence that insight could, in fact, be gained from talking with pilots and FBOs. Second, and more important, it provided a basis for setting our expectations about the degree of social impact likely to result from airport development. The literature that did exist, largely the exhortatory literature summarized in Chapter Two, leads one to expect considerable activity and therefore significant consequence. But our site visits simply did not confirm those effects. These brief visits also afforded an impressionistic basis for judging the accuracy of information we later received from the Division of Aviation and the Division of Economic Development about what had happened at the community level. It was important as well to get an impression of the way the Division of Aviation, particularly Director Crabtree, operated. Beside being one of our major sources of information, Crabtree turned out to be the hero of the story. And because almost every aspect of the Airport Program, compared to massive technological projects, was of relatively small scale, Crabtree's style of operation would be of great importance.¹¹

A second aspect of the field experience spoke to a complementary need to get a subjective sense of the social context of Ohio's rural culture. An important element in this process was a short, intensive "reconnaissance" into a number of rural communities. Due to logistical limitations the team had to pick, within a week's time, six or seven communities required for intensive study out of a possible sixty. Because state demographic and economic data was so scanty, not much could be done before arriving in Ohio to narrow down the alternatives. Even after a week of intensive briefing and orientation in Columbus, the job of selecting our six counties was plagued by insufficient knowledge about the twenty or so counties which remained as alternatives.¹²

After an intensive session in which all available information was pooled, ordered and used to construct informal hypotheses about what might be going on in the remaining counties, ten were selected, and the team split up and visited each community over a long weekend. For all the subjectivity and impressionistic qualities of this process, these informal visits to prospective communities proved absolutely invaluable in assisting us to come to a final decision in the choice of sample counties. Returning to compare the new information, the team was able to get a much better sense of the scale of social activities and of the similarities and variations likely to be found in these communities if a return to them was called for. Perhaps the most important part of this process was an opportunity to see the airports in the context of these communities, something which simply could not have been done by studying, however intently, economic or social data normally gathered by the U.S. Census or State Department of Commerce. The reconnaissance process also had a bracing effect on our expectations...it was surprising how little apparent impact the airports seemed to be having.

Just as on site visits had increased the team's familiarity with the substance of airport activities and the character of the communities, so the interdisciplinary approach used for the community study increased the accuracy of our findings. This stage was a highly coordinated, intensive process in which the various perspectives of the team members, representing political science, anthropology, and planning and management,

provided complementary interpretations of the information being gathered¹³ Experiences were compared, hypotheses explored, and insights traded, as the three segments of the study were developed. Thus mutual experiences with local political notables, corporate managers and recreational flyers were being compared and contrasted as the team went about improving its understanding of each community This exchange resulted in increasingly refined hypotheses and improved effectiveness in data gathering Refinements in our hypotheses represented, in effect, the surprises we encountered Perhaps the more salient among these to us were the remarkable flexibility of the Division of Aviation in implementing the several stages of the airport program, the degree to which local initiative had played a part during the "selling" phase of program development, the importance of the FBO in the operational capacities of airtransport, the quite varied uses to which airtransport was put by corporations, and the absence of "glamor" in the activity of flying as articulated by recreational flyers Most team members registered surprise at most of these findings, largely because of personal subjective expectations and variously conceived stereotypes of private pilots and their subculture Some expectations may have been quite naive, others less so, but the point is this that any research team or group of technology assessors should be prepared to encounter surprise--the skewing of personal expectancy--when actually venturing into the field and exploring how a technology is perceived by those who operate it, those who use it, and those who are indirectly touched by it

Our method also revealed an important quality of small scale systems In small, homogeneous communities, such a team can quite quickly identify the network of relevant actors with regard to a technology's development and its subsequent administration One of the primary indications that we had done so was the relatively few interviews required before a high redundancy in information was apparent. There was also a remarkable amount of agreement about the facts of what had happened during and after airport development among some men and women who might disagree rather markedly about the value of the enterprise. Most of our

interviewees, though, shared much the same perspective of social reality. While some responses were unexpected, most are consonant with our initial impressions of the relatively small scale of activities both at the airports and within the communities. It is quite likely that in an examination of technological impacts upon urban areas or over widely dispersed geographical areas, such homogeneity would not be present, agreement would not be as widespread, nor would the identification of relevant actors be so rapid. In a sense, the varied set of built-in perspectives held by the interdisciplinary team provided a kind of internal consistency check. A relationship perceived on the parts of people with several different perspectives was more likely to be important than such a relationship perceived by only one member. But a more important method for increasing consistency of findings was a conscious attempt to seek out cross-perceptions of and complementary perspectives on a common process of technical development.

We were convinced that if technological developments are, indeed, experienced as social activity, then perspectives on this development would vary, as they do on any fairly complicated social process. Therefore, it was important to "coordinate" the perceptions of different actors and search for points of difference and congruence among them. Also, potential distortions of attribution were weighed as various opinions were solicited, on, for example, how the communities felt about this or that event or on the behavior of corporations. Thus, there was a systematic attempt to compare perceptions of the men of the Division of Aviation with those of the leaders of the various communities, the representatives of the Division of Economic Development with those of the local FBO's, and the people who had been in Governor Rhodes' office with those of Crabtree and the community leaders. Perceptions, which almost of necessity will be colored by circumstance and position, could in such a way be "corrected for" in constructing a description of the impacts of other technological developments. A particularly important part of this check was the sequence of collecting data from the Division of Aviation. While informal acquaintance with the Division shaped our initial understanding of the airport program, systematic study of the DOA

was delayed until the completion of the studies of the seven communities. This procedure was followed so that the perceptions of the communities could provide the basis of questions to be asked then of the Division. In this way things that seemed salient to the communities but had not appeared of particular interest to the Division would be brought back to its attention.

Conclusion

This chapter has presented our reflections on the success of the Ohio County Airport Program and on aspects of the research process. Evaluations of the policy accomplishments of a public program and of methodological concerns are often treated as relatively separable parts of a technology assessment. They are, of course, intimately related. This is very much the case for our study of the Ohio County Airport Program. Perhaps the clearest implication of this relationship is that our particular methodological choices impose important limitations on the degree to which the study's findings can be generalized, either for confident evaluation of the entire Ohio County Airport Program or for straightforward transfer to other airport development projects. We conclude this chapter with a discussion of some of these limitations, the opportunities they present for further work, and one of the lessons they suggest about the social assessment of technology.

It should be remembered that the airport program provided over sixty airports across the width and breadth of Ohio. These airports were built in various settings and near a number of different communities. From these sixty we selected only seven, each with two important properties for the purposes of our research. Each airport was in a county with over fifty percent rural population, and each had been established early in the Program's life. This meant that our study did not include a number of airports provided to communities in semi-urban counties, nor airports which had been in the more recent second wave of construction. These exceptions should be kept in mind in reviewing any evaluation of the Program based on our findings. Although wholly adequate

for the purpose of our study, the sample for policy evaluation purposes is biased.

For an exploratory study such as this it was important to keep many of the complicating factors of urban development from confounding an already complex set of relationships. It was also important to select airport developments which had been in place for some time--otherwise development would have been too scant to be explored. But the upshot of studying airports that had been in existence long enough for our purposes was that they were in communities which had received them near the beginning of the Program, this early involvement means that the communities already had some interest in airport development. Thus, those many communities which had to be persuaded to seek an airport were not represented in the sample. The dynamics of implementation may have been somewhat different in those counties, although we think probably not much different for the smaller ones. But the quite rural character of our seven communities may have introduced another important limitation. Almost by definition urban counties that received airports had more general activity. Thus the dynamics of airtransport might be quite different there. Our findings could be modified by the experience of more urbanized communities participating in the Ohio County Airport Program.

Extending the sample of airports and communities is, of course, the most important requirement for increasing confidence in the general application of the findings. Such an improvement would be necessary for a credible technology assessment of airport development or before an evaluation of Ohio's Program could have high validity. Clearly, extending the sample as the next stage of this study is much more sensible than to have selected a large sample in the beginning before preliminary questions had been explored and a study design tested out. In a follow-up phase, the sample could profitably be enlarged to include a larger proportion of Ohio's counties, with more representation of semi-urban counties and communities of varied sizes and with particular emphasis on communities that received their airports later in the Program. If possible, the study might also include several counties which neither received airports nor had existing ones. (In the Ohio case, this would

be very difficult because virtually every county has an airfield. Although the state governmental situation would be somewhat different, some counties adjacent to Ohio in Indiana might act as a quasi-control group.)

Expanding the sample within Ohio only increases the quality of information related to Ohio airports and communities. Such a sample does little to assist the policy maker in designing an airport system which has different topographical properties or different cultural configurations from Ohio. Nor does it help much in determining the relative impact of airport development of greater scale than the "4,000 feet of county road" put down by the state Division of Aviation

A study comprehensive enough adequately to undergird a social assessment of airport development would require coverage not only of different types of airports, but it would also require an exploration of the impact of these airports upon communities of varied levels of development and size located within states whose styles of doing public business vary. Of particular interest would be a comparison of states like Ohio having few, if any, geographical or topographical properties calling attention to the unique advantages of aviation with states such as Alaska, Hawaii, Idaho, Michigan, Texas, and Florida. These states have quite special problems in transportation and communication for which air transportation is an especially attractive solution.

But in the search for such solutions, the magnitude of airport development may vary enormously. The small compact airports developed by Ohio's Division of Aviation are the minimum development, at the other extreme is the gargantuan Dallas/Fort Worth International Airport, sweeping half-a-dozen small towns into its orbit. The more familiar regional and trunkline airports find an intermediate place between the extremes. It should be clear by now that even if we do not consider, as one should, the varied response prompted by differences in political and economic culture, there is a sizable job to be done before enough information is likely to be available for a thoroughgoing assessment of technologically triggered social consequences. Figure 10-2 illustrates

some varying combinations of community size and airport size and community size. A thorough study of the airport-community relationship would need to include developments such as those given as example below.

FIGURE 10-2

		<u>Size of Airport Development</u>			
		Small	Regional	Trunkline	Superport
Size of Communi- ty	Small	Fayette County			Dallas/ Ft. Worth Dulles (D.C.)
	Medium		Lima Sioux Falls		
	Large			Columbus Cincinnati	
	Metropol- itan	Meigs Field (Chicago, Lake Front)	Santa Monica	Washington, D.C.	J.F.K. (N.Y.) O'Hare (Chicago) Los Angeles

Based on more or less familiar methodological considerations in the social sciences, the discussion in this chapter has been reasonably direct and not unusual. Yet the level of effort in pursuit of credible findings to make the argument generally understood implies a level of effort seldom recognized by those who have called for technology assessments and policy analysis. In the search for believable estimates of social impact, it must be

remembered that theories of complex social behavior do not yet have the predictive qualities of scientific theories familiar to the engineer as he works with the simpler phenomena of mechanics, electronics, hydraulics or chemical synthesis. Even with such well tested theories a good deal of time, effort and funding is expected if accurate measures are to be had.

In matters of the much more complex technical, economic, social and political consequences of technological development, underlying theory, development of measures, and aggregation of data all must proceed together. Physical scientists and engineers have, quite sensibly, refused to take up this triple task unless the funders' expectation levels and the level of resources available are both realistic. In the present programs of technology assessment and policy analysis related to technological development, the level of apparent support and the expectations implicitly projected to potential researchers underestimate the character of the problem rather badly. Both the expectations and the level of resources available suggest that funders either put much more faith in the "common sense" than has proved warranted or they really do not seriously want to find out what many of the social, economic and political consequences are likely to be. It behooves anyone interested in technology assessment to estimate very thoughtfully the resources necessary to improve both the underlying theory of and measures for charting the social impacts of technological development. It is altogether unreasonable to expect greatly improved knowledge on cut-rate support. Both the level of effort expended in this study and the limitations of the data collected should be instructive in this regard.

NOTES

¹Systematic evaluations for either part of this project were not really appropriate. In the case of the County Airport Program itself, we were fairly certain, even at the outset, that the kinds of measures and conceptions available from the usual evaluation area were likely to be much too gross to pick up the more subtle aspects of limited developments in small communities. In fact our effort has been bent toward getting a better idea of the relationships and effects most sensible to include in an assessment of this sort. Since this had not been done at the time of the study we could not include them systematically in our work. We faced much the same problem with regard to the methodological portion of the study. This sort of thing had not been attempted; the more or less familiar social science techniques continued to be applied. While we had confidence in the techniques themselves we did not have a clear sense of the problems which transferring them to this sort of project might entail.

²It should be remembered that there was a "Phase II" of the Ohio County Airport Program which involved a second appropriation several years later of about \$50,000 per airport. This was used for further improvements on the airports built on Phase I funds and to add a few other counties to the list of those that already had established county airports.

³The complexity of the criteria underlying evaluation and judgments often produce divergent "success" estimates. It should be noted here that even within our research team, judgments differ--some of us are more positive than others. The sentiments included in this chapter are mainly those of the senior author and principal investigator. Some in the research team believe he has been more generous than the situation warrants.

⁴See J. D. Thompson, *Organizations in Action* (New York: McGraw-Hill, 1967), Esp. Ch. 7 on organizational assessment.

⁵This scheme of *Program Objectives* and *Evaluative Perspectives* includes our estimates of the degree to which "success" was attributable to the airport program from the point of view of observers representing each perspective. Although we did not ask these people directly to make scaled evaluations of the Program, the information they gave us was confidently transferable to the scheme in Figure 10-1.

⁶But here it would be well to consider that had the Division of Aviation demurred in linking the Airport Program with more sweeping public goals, particularly economic development, neither Ohio's legislature nor Governor Rhodes would have been likely to include the Program in the

huge bond issue at all. This qualification points to a fundamental limitation in the kinds of policy evaluations normally carried out. Policy evaluations most often are premised on the articulated goals of a program or agency. While it is quite sensible that this be done, such analysis should distinguish between those goals which are closely relevant to the technical strengths of the agency and those which have been taken on as a means of gathering political support for the agency in the first instance. Rational analysis of technical accomplishment alone frequently masks the less quantitative aspects of program legitimation. Certainly this element in organizational life must also be a part of the evaluation.

⁷This was exclusive of editorial support and other logistics monies. Obviously the team drew on prior work of a more general nature which had been done the year preceeding our work in Ohio. See both the 1971 and 1972 "Progress Reports" to NASA-Ames.

⁸This seems to be the case for virtually all problems in the social assessments of technology. We simply do not have anywhere nearly adequate data base for most technologies assessments.

⁹See Appendix for documents instrumental in these intermediate stages of the project.

¹⁰These aspects of a systematic study based upon social science concepts are familiar to anyone who has engaged in field research. However, they are not part of the regular, expected kit or tools recommended in the literature of technology assessment, or policy analysis. We include them here to highlight the importance of such procedures in the study of technological impact for they are almost always ignored; perhaps worse they are often, not even considered in the press of time and limitation of resources. The implicit assumption seems to be that "expert" informants and existing literature provide such a clear, accurate vision of cause and consequence that seeking confirmation is not practical. We believe this to be absolutely unwarranted assumption at our current stage of knowledge.

¹¹Paranthenetically, one of the most fascinating aspects of the whole project was in getting to know this man of enormous energy and flair. He provided a most remarkable introduction to Ohio aviation, to the political culture of the state, and to his group's flexible and very mobile style of operations.

¹²See Chapter Two for a description of this process. In effect, the team needed assurance about the more detailed character of the prospective communities.

¹³The principal investigator assisted in the study of the first community to make sure that the conceptual notions developed before

entering the field could be usefully translated into questions used in interviews with local notables, corporate representatives and recreational flyers. Other aspects of the field situation were monitored and found to have been admirably accomplished by the four team members. Three members of the team then completed another five communities; The seventh was visited several weeks later by two remaining team members.

CHAPTER ELEVEN

TOWARD MORE ADEQUATE TECHNOLOGY ASSESSMENT

Our final task is to address the implications of this study as they relate to technology assessment generally. Given the limitations in the present state of that enterprise, going beyond the particular is an essential task which should be required of all those now doing technology assessments. Without more general consideration, improvements in the process of technology assessment are likely to be slow in coming. Need for improvement is readily apparent in both the methodological sensibilities of technology assessors and in their conceptual and substantive insights regarding the process of technological development and the relations of various types of technologies to social experience. This concluding chapter moves beyond description, analysis and informal evaluation of the Ohio County Airport Program and beyond our reflections on the particularly valuable aspects of our research process in rural Ohio and, still within the context of that experience, addresses methodological directions essential to technology assessment and conceptual concerns inherent therein. We hope the results contribute to a firmer orientation for researchers in this field rather than simply to the increasing volume of paper confronting them.

IMPROVED METHODOLOGY IN TECHNOLOGY ASSESSMENT*

Methodological concerns have been a dominant preoccupation in much of the technology assessment literature. Discussions of a methodology for technology assessment have approached the problem as if it were mainly an exercise in systems engineering and management.¹ Objectives are called for, sequences of information collection and arrangements are outlined, and methods of presentation are suggested. All these directives seem to

* Stephen Rosenthal contributed initial drafts of this section.

imply that a good deal is known about the impacts of various aspects of different technologies upon personal, group, economic and social experience. Thus the methodological problem is the collection and management of information--information which, it is believed, will speak congenitally to questions about the effects of delivering new or improved technological capacities to people and groups to whom they have not previously been available. If our experience with airports in Ohio has taught us anything it is that these implicit assumptions are not warranted, and that T.A. methodology must begin by acknowledging the general absence of tested knowledge about technology's impacts on social experience. We address ourselves to this situation.

A major premise of our approach to technology assessment--noted several times in this report--is that an understanding of the many ways in which technological innovations and development affect human experience is essential. Technology, then, should be viewed as a social activity carried out by people who interact with other people differently from the way they would if the technology were not involved. Chapter One devotes considerable attention to such a view. In effect, our study of the Ohio County Airport Program was an attempt to take that premise seriously by going "into the field," to those places where people would be likely to be affected by the financing, construction and operation of small, rural airports.

Had there been a body of rigorously developed material from which hypotheses could have been deduced, our work could have proceeded more straightforwardly. The usual well formulated question, hypotheses and relationships could have been specified, a sample drawn and a large systematic study completed which could have been aimed at rather conclusive assessment of the technological development of air transportation. We have argued that this was not possible. Thus much more attention to modified "start-up" and pre-test phases was required than in areas for which there is adequate theoretical and empirical background. Based on our own experience and drawing from more general methodological literature, Figure 11-1 summarizes the various steps of both the "start-up" and pre-test stages which might be followed, along with a generalized

version of some elements in full scale study in assessment which could follow from such smaller pre-test studies as we conducted in Ohio.²

Research, then, is usefully viewed as a learning process for the observer, whether he is a social scientist or a technology assessor. Accordingly, the process is an iterative one in which the researcher expects to achieve successively refined formulations of the impacts of the technology, as well as an increasingly accurate sense of the public policy issues involved. Technology assessment begins with a process of exploration, rather than with straightforward linear analysis familiar to operations research or its numerous management analysis cousins. Much of the literature concerned with methodological questions in technology assessment glosses over and implicitly rejects this point of view. In the major report on this subject done by the MITRE Corporation noted above a set of general guidelines are presented which concentrate almost entirely on the types of information a successful technology assessment should contain. This report, like other less complete discussions, is almost completely silent on the matter of how to seek the information which would be summarized in whatever categories were conceptually reasonable.

Even at the initial stages of a technology assessment project, our perspective urges some modification in the generally followed procedures. The familiar management activities of defining the objectives of the effort, forming a research team, searching the literature and developing the study design take on a special quality. These activities must proceed on the assumption that the problem to be studied is not very well understood. Therefore, all "start-up" efforts should be reviewed to insure that subsequent stages of the project are likely to enrich an understanding of the social impacts of the technology as well as its economic and technical consequences. Initially, the objectives of the study should be defined in terms of the policy decisions to which the study result are intended to speak. To this goal should be added the objectives of extending the understanding of the relationship between the technical process and individual experience and of clarifying policy alternatives so as to assist the selection among them. Objectives

FIGURE 11-1

A METHODOLOGICAL OVERVIEW
OF A PROPOSED TECHNOLOGY ASSESSMENT PROCESS

I. START-UP

Initial identification of TA objectives
Formation of Interdisciplinary Research Team
General orientation to existing perspectives on the problem
Initial research designed



II. PRE-TEST

Selection of site(s)/situation(s) for testing research design
Field Research in selected sites
Analysis "Unpacking" the technology

- °Identification of types of impact
- °Identification of types of actors related to the technology
- °Development of alternative conceptual framework

Formation of hypotheses



III. FULL-SCALE ASSESSMENT

Full-scale research designed

- °Specification of sampled sites/situations, etc.

Field research in multiple sites
Validation and refinement of analytic categories
Assessment of impacts quantitative and qualitative
Communication of findings

of the study should not be so tightly structured as to limit the possibility of altering or adding objectives as a consequence of the experience in the field portion of the study.³

In organizing a research team, account should be taken of the particular requirements of the particular project. In addition to the usual criterion that the team include adequate representation of different disciplines, members should have the ability to interact closely with each other and should be skilled in interviewing different groups of users, managers and regulators of the technological innovation in question, and, rather than share an expertise in the particular technical area, it is probably more important that the team members share a common interest in the general notion of technology as personal and social experience.

Typically, once the team has been assembled, a search of the literature is its first major undertaking. In a situation of flexible objectives and limited available background materials this search should be carried on through a broader range of areas than is usually the case. It is not always clear what literature will be relevant. Often historical, sociological and anthropological materials are more useful than direct economic and policy analytic materials. Indications of the social impact of technology can also be found in the popular press and media. While usually not developed in systematic form, press accounts can provide clues to potentially important effects of a technological innovation as well as the types of public issues likely to emerge around its development. Finally, and perhaps most important, the people who are "in touch" with the technology in their everyday lives are vital sources of information and insight, both as current receptors of technology's "impact" and as referents in the study of the less obvious, indirect and/or longer-term consequences of technical development.

A synthesis of these sources of information provides the basis for the pre-test stage of the effort. Weaving together materials from the sources available and forming hypotheses about the important relationships likely to exist between a technical development and the social experiences of those who carry it out and those who use it form the basis for entering into the field. The "start-up" stage, then, provides an opportunity to

identify provisionally the key properties of the technology and its impact which might be examined more fully in subsequent stages. The social properties and hypotheses identified at this stage are *expected* to need to be refined, or possibly rejected. And very likely others will be added at later stages.

In the face of limited knowledge about technology-and-social-experience in general, the pre-test stage encouraged by our experience is more of a learning opportunity than is the usual, rather straightforward feasibility test. In the standard pre-test of survey research, for example, the instruments to be tested are as close as possible to the final survey instruments for the full scale study. But in the approach suggested here the pre-test proceeds along a more tentative course, a field reconnaissance in which the loosely structured notions about technology's social impact developed in the "start-up" stage are modified and sharpened in an attempt to provide a firmer empirical basis for a full-scale technology assessment. The function of the pre-test, then, is to go through the first iterative step in successive approximation. Our form of pre-test contains the complete array of field research activities: entering the field, watching, interviewing, listening, recording and analyzing.⁴

Where this watching, discussing and listening take place--the site chosen for the pre-test--is one of the most crucial aspects of this stage. The character of the refinements of initial hypotheses and relationships is obviously strongly determined by the social setting into which the research team goes. In our study of the county airports in Ohio, the special properties of midwestern rural life had to be taken into account. Thus the social characteristics of the site for pre-test both provide an enriched source of data and impose limits on the degree to which the results of the pre-test may be generalized. An appreciation for the variety of social and technical situations, for variation in community development, local culture, and other factors important for theoretical and empirical reasons to a full scale assessment, should be clearly in mind when test sites are selected.⁵

After the pre-test site has been chosen, then intensive field work begins. This stage follows the usual procedures for field work, with the additional expectation that new hypotheses may be proposed to replace or modify the preliminary ones under continual review. The underlying conceptualization of the relationships between the particular technology and community life may also be modified in mid-stream. Obviously if there is a great deal of revision, the team may be required to go back to the communities, organizations and people already visited to pick up data not previously gathered so as to be assured of consistent and comparable data. In gathering data from the people involved with the technology a sufficient redundancy of information from various respondents should accrue so as to increase consistency of description yet at the same time the questionnaire format should be such as to minimize overly repetitious *individual* interviews. In this process the researcher must use his own judgment and not be overly constrained by rigorous data standards necessary for definitive statistical analysis. Stringencies to ensure accuracy of data collection are warranted only when there is considerable confidence in the conceptual utility of the questions. Such confidence must wait the completion of the pre-test stage. Considerations of data consistency are clearly more appropriate for the full scale assessment study.

After the data from the field study has been collated, intensive analysis is in order. Perhaps a central indicator of success at this point is the extent to which "surprises" are produced. As the data about the technology and its impact on communities, organizations, etc., is "unpacked," new relationships are sought and expected ones are reviewed for accuracy of prediction. The data should be analyzed in the hope of identifying types of ambiguity, on the one hand, and, on the other, for converging data from various sources which would increase the descriptive realism of the analysis. In the case reported in Parts II and III above, it was relatively easy to "unpack" the technology. Key actors were relatively unambiguously apparent. The people involved with implementing the Ohio County Airport Program, officials in the Division of Aviation, and community leaders, as well as those involved in airport

use--the Fixed Base Operators, corporate managers and recreational flyers--all could be readily identified. The system was relatively small, thus, even though there were tight resource limitations on our study, relevant actors in the situation could be interviewed with sufficient depth for a pre-test stage. And, indeed, we were surprised at several points: Many of our initial hypotheses proved to be unfounded, and several features both in the Program's implementation and in its impact on the communities unexpectedly presented themselves.

A part of the process of discovery is enhanced by a variety of perspectives within the research team. A review of the data from the vantage of a variety of perspectives, undertaken in the spirit of suspended allegiance to particular disciplinary paradigms, is likely to result in a rich, and well balanced perspective. In effect, this process is an adaptive one within the team, for which disagreement and debate is likely to be highly functional. Arguments among team members having different interpretations of the same data often produce insights which would be overlooked in a situation of facile consensus. Through this process, the team should hope to supplant as well as supplement some of its original hypotheses and develop new theoretical insights based on observations in the field.

It ought to be apparent by now that one of the primary qualities necessary for a researcher in this type of study is a relatively high tolerance for ambiguity. Though standard quantitative techniques may be applied in more or less traditional ways during some stages of the assessment process, this probably should not be the dominant mode for some time to come. Rather, until there is a much more firmly grounded empirical base, researchers and analysts will need to be keenly sensitive to the meaning technology has for social experience. This is a highly subjective and qualitative mode of inquiry, of necessity, therefore, analysis is likely to be ongoing, self-corrective and cumulative over a much longer period of time than may seem comfortable in the press of policy decision timetables.

Once the relationships and hypotheses developed from the pre-test stage have been refined and reformulated, a *full-scale technology assessment* can be mounted. With the groundwork of the aforementioned stages

completed, many of the ambiguities of the technology/community relationship should have been clarified so that a much firmer basis exists for mounting a larger, often very expensive study. The methodological aspects of the full-scale assessment are familiar and we need not dwell on them here. Suffice it to say that elements in the larger study should share some of the characteristics of the prior stages. That is, there should be field validation checks in situations which are clearly not covered by the pre-test stage. This is particularly the case if the technology is likely to be distributed over widely varied geographical and/or cultural space. These field probes within the full-scale study can be seen as a parallel set of cumulative case studies which enrich the meaning of the quantitative and abstract economic and survey types of analysis.

A final methodological note. It seems evident that the credibility and completeness of available information will vary from technology to technology. We know, for example, a bit more about the biological consequences of nuclear radiation than we do about the long term social effects of organ transplants or solar energy systems. This difference is due in part to the fact that some technologies have been in place for some time and their effects can be studied in retrospect. Hence the development of airtransport and airports in Ohio and many other places can be studied. But this is not the case for technological innovations that have not been implemented very widely, if at all. The methodological problems of assessing the various alternative methods of disposing of high level radioactive waste are a good deal more difficult than they are for airtransport because there is little if any ongoing experience with the phenomenon. Since the impact of an untried technology can really only be studied analogically, the methodological problems are multiplied. At best, analogical studies are a tricky business, discovering close and informative analogs may be very difficult and may even produce misleading results. But these difficulties are inherent in the pursuit of the social assessment of technology. The message for the analyst is clear. For every technology assessment it is essential to ascertain whether available information about an existing conceptualizations of the technology form an adequate background for a full

scale assessment project; If available backround materials are found inadequate the process addressed herein becomes requisite.

SUBSTANTIVE GENERALIZATIONS FROM THE OHIO COUNTY AIRPORT EXPERIENCE

We turn now to some demonstrative generalizations about implementing technology based public programs and the effects of improved air-transport capacities upon small communities. These "conclusions" are based on a combination of our experience in rural Ohio and the hypotheses derived from the literature of transportation and the social sciences more generally.⁶ While these generalizations must remain tentative due to the limited scope of our study, they are suggestive of insights necessary to deepen our understanding of the consequences technological development for social and community experience.

Findings are presented in three segments. The first concerns lessons issuing from an exploration of how the Ohio County Airport Program was implemented, the second deals with the consequences of different aspects of airport development for seven rural communities and the requisites for increased use of airtransportation capabilities in these communities, and the third is a speculation about the conditions likely to be associated with disruptive technology triggered social change.

Implementing the Ohio County Airport Program

The story of the Ohio County Airport Program is one of policy implementation played out by strong personalities in a context of high organization risk. Judged in terms of actual airport construction at relatively low costs the Program was a remarkable success--over 60 airports were funded and completed in less than eight years at a cost to the state of about \$150,000 each. But beyond an appreciation for the importance of personality in the policy process, other findings emerged with regard to the internal organization of the implementing organization and the character of its relationships with the external environment.

1. The internal structure and processes of organizations charged with implementing public policy can vary in size and in their internal

arrangements. *Holding size of the organization constant, as the amount of overlap among technical, managerial and institutional levels and function increases, so do the possibilities of unusual entrepreneurial opportunity.* Due to these overlaps opportunities can be taken up more quickly and surely than in organizations of larger size with few overlaps in jurisdiction. The Division of Aviation was small and organized so that the various technical, managerial and institutional functions overlapped among its members. Overlapping jurisdiction enabled the following: a) Increased possibility of flexible leadership styles among technical and managerial levels, b) Increased political support due to the possibility of rapid change in the details of a technology (airport construction) which has a high degree of technical predictability, and c) The extension of technical work beyond the purely regulatory, in an organization charged essentially with a regulatory function, and consequent enlisting of political support from both executive and legislative groups.

Therefore, in the implementation of technically based public policy programs (and perhaps others as well) smaller organizations with functional overlaps are more likely to be able to take advantage of social, political and technological opportunity than large, highly compartmentalized organizations. Nor is it likely that such an overlap can only occur in any but relatively small organizations. One implication of this research for the design of implementing organization is to develop the technology in such a way that the implementing organization can be small with overlapping functional levels. Massive technological programs are less likely than smaller ones to produce opportunities for flexible adaptation to the variations in the communities which will be subjected to the changes induced by those programs. For large-scale programs, then, this finding may imply the necessity of providing explicit public regulatory mechanisms to assure protection against mammoth, inflexible programs.

2. Whatever the character of the internal structure of the implementing organizations, technologies vary in the degree they will affect the communities to which they may be delivered. That is, the same

technological development will have multiple and varied consequences as it is implemented and developed through time. One kind of consequence is the varied mixture of several types of policy outcomes or results. These range in our case over externally imposed regulation of airport activities, self-regulation of those activities, with distribution of benefits through social processes similar to those by which other benefits are distributed within the community, and, especially over the long term, redistribution of community resources. It was clear to those who managed the Ohio County Airport Program that it could have a variety of effects on the many communities which they hoped would take hold of the opportunity to acquire airports and they made a concerted effort to restrict a wide variation across these different types of outcomes from community to community. The way the airport program was implemented by the Division of Aviation produced several politically salient regularities. State officials consistently portrayed the *decentralized* aspects of the program as benefits. The Program was a *distributive* policy every county that wanted an airport could get one. Moreover, the (sometimes troublesome) construction phase was billed as a *local* community project. By contrast, the potentially divisive decisions on where in a given county to locate the airport were *centralized* into a decision made by the Division of Aviation on purely technical grounds. Not surprisingly, distributive programs which are perceived to provide decentralized benefits, and offer to shift potentially difficult tasks onto the state, will be favorably received. Thus, *technological programs which are implemented in ways that increase the perceived likelihood of self-regulatory, distributive outcomes are much more likely to avoid local political opposition and gather at least minimum support.* They are also likely to result in minimum dislocation within the community--though perhaps at the expense of regional or national goals which require substantial community changes. Again, the small, flexible character of the Division of Aviation enabled it to work out the necessary local accommodations for airport development which would realize self-regulatory and distributive effects.

Generic Applications of the Ohio Experience

Aspects of Airport Development. The several phases of airport development and operation--construction, existence, use--provide a basis for more general assertions about technology and its impact upon community life. Clearly, the activities associated, respectively, with a technical facility's construction, with the physical presence of that operational facility, and with the use-related activities conducted through it can vary in magnitude from relatively limited ones in relation to the surrounding community to quite substantial ones. The more extensive the development, the more the relative impact. Impact can vary from one extreme in which the technical development is simply absorbed into the existing order of things to the other extreme where the development overwhelms the surrounding community and prompts considerable social adaptation to the technical development. The hypotheses outlined below speak variously to such developmental contingencies, findings from the Ohio airport study are again summarized--this time in the context of these more comprehensive and general hypotheses.

1. *For new technologies that require structural changes, especially the construction of physical facilities, the construction or "establishing" phase is likely to have effects quite different from the other phases in that they may be more protracted.*

- A. *Relatively high costs* often required in this stage could foreclose the future flexibility and operational viability of the airport and the superintending body--county government. In the Ohio situation, such costs had relatively negligible effects. They were the source of difficulty in only one of the seven communities studied.
- B. *Commitment to provide a physical site* and to assure operational adequacy may constrain the future in special ways. Such commitments in the Ohio development were within the general capabilities of local communities to adjust to without dislocation--again in six of the seven counties.
- C. The construction phase may bring credit or blame to particular persons and affect the relative status among local leaders, thus

becoming a *source of leadership changes*. This did not happen in any of the counties. The airport development was not dramatic or large enough to elicit either much praise or blame.

- D. Establishing new facilities may, under certain conditions of governmental or corporate restriction or intrusion, thrust a community into significantly more contact with other levels of government, thus *increasing the general level of political complexity*. While this was apparently true at the very beginning of the development--at the persuasion stage, as it were--before any local plan had been adopted, this interaction was limited and transitory. As a result, there have been little overall increases in the systems complexity.

2. *Subsequent to their physical construction, the new technical facilities, by virtue of their existence, provide both services and social stimulus according to their functional purposes, the size of their operation, and the meaning people attribute to them.*

- A. Being at minimum a place to land, an airport may provide an alternative to coming in on an open field or at another airport which is more congested. If so *air safety is increased and traffic dispersed*. The Ohio County airport system served well its goals of flight safety and emergency facilities provision.
- B. Airports often appear to attract local industrial development around their perimeters. Because a convenient air terminus exists, corporate management may be encouraged to make decisions to expand existing plants or locate new ones in the community. The county airports did facilitate *existing* corporate operations, and these firms provided significant support of airport development. In the seven counties included in this study, however, there was little evidence to support a conclusion that the airports of the Ohio County Airport Program were significant determinants in plant location or expansion decisions.
- C. After facilities are built they must be kept up, physically and as operating units. Such costs may be a burden for the superintending organization unless there is offsetting income. In the Ohio counties the cost of airport maintenance and operation was disproportionate to the income they netted local government. Each airport was

subsidized to some degree, some only a little, others rather substantially. In most cases the relationship between the airport manager and the county was afflicted with sufficient ambiguity that continuous, low level tension resulted. In the face of continued mild struggle to keep the airport in usable shape, voluntary contributions were successfully solicited from the local recreational pilots.

- D. Finally, the visible presence of a technical facility, depending on its style and setting, may represent a bit of the future or a remnant of the past. In the Ohio counties the airports were seen as *symbols of modernity*--as attractive accommodations which lent credence to the local belief that these rural communities were indeed keeping up with the times.

3. *The existence of technical facilities encourages an increase in various uses of the capacities they enable. These uses in turn may or may not trigger a chain of events which alters the context of community life.*

- A. New technical capacities are often encouraged in the hope of promoting economic development. Were airtransport capabilities to be used increasingly for business traffic or were there to be a dramatic increase on the transient servicing of air traffic through the airport, it is likely that the community's general *level of commercial vigor would be raised*. Since no plants in these counties were located there or expanded directly because of the local airport, commercial activities associated with this development cannot be attributed to the airport development. But most of these airports were ongoing concerns, financial exchanges were sufficient to sustain a small enterprise. Routine activities in addition to the occasional use of charter and other services by local firms seem to suggest a small but detectable contribution to local economic vigor.
- B. Non-economic use of new technical facilities may also occur. A new airport may, e.g., encourage inclination to "take-up-flying-for-fun." There was little doubt that these airports prompted an *increase in recreational flying*. The new facilities and training

operations reduced the inconvenience and enhanced the attractiveness of private piloting.

- C. Increased use of technical, energy based facilities could *increase various forms of environmental pollution* even through the effects of moderately sized operations in the longer term. In these counties this was not perceived as being the case. Operations were neither large enough nor close enough to residential areas to evoke concerns for water, air, or noise pollution.
- D. If the new technical capacity is used for new commercial and/or recreational activities, *new associations may be formed* and extended into relationships not directly associated with that capacity. Furthermore, if wider geographical areas become accessible to local citizens, this new access could *expand their sense of spatial relationships* and thus they might see their community within a wider social context. But neither of these things seemed to result in our communities. Ohio, even rural OHio, is too tightly enmeshed in webs of communication and mobility for a small additional increment of airtransport capacity to add significantly to already formed views of the world.

Requisites of Use. The activities noted above which are attendant upon a new technological capacity are contingent upon certain requisites, chief among which are the *demand* for the capacity and the *resources* applied to encourage its use. Thus·

4. *If there is an existing demand for the services provided by a new technical facility, then it is quite likely that it will show increasing use.*

- A. If a market already exists, then obviously the task of a new technical capability is to service that market well. In none of the counties in this study, however, was a pre-existing market for airtransport much in evidence, either for commercial interests or for recreational aviation needs, either to service operating pilots or provide facilities for training new ones. Thus what increases in airport uses were evident had been stimulated by substantial investment of personal or public resources in order to create that market.

5. Among the most significant resources in the use stage of development of a new public technology are managerial skills and individual expertise and the organizational arrangements relating management to operations--the character of the relationship among concerned public agencies and the extent of their contributions.

A. The more efficient and enterprising the management of a technical facility, the more likely it is that its capacities will be utilized to a degree consistent with public investment. The case of the Ohio airports is somewhat special in that management came most often directly from the private sector. Critical factors in realizing the potential benefits of the airport facilities were recruitment of a manager with aviation skills and the nurturing of his management and personal skills. In the face of a nonexistent or weak market, the FBO's who took it upon themselves to "teach" potential users that airtransport could add both profit and stimulation to their activities led the way by showing local firms the utility of airtransport and encouraging non-commercial flying. In counties where the FBO did not take such initiative, airtransport had not come close to realizing its potential nor the airport its auxiliary function.

B. But management is no simple task and is often dependent upon certain topical conditions, among them the degree of system support provided. In the case of the Ohio airports, two types of organizational set ups worked most effectively--a local corporation responsible for managing the airport as part of a more varied range of operations, and an FBO who managed one or more airports on a full time basis. But this latter situation, in order to prosper, required special conditions dependent on the county government. County governments vary widely in the degree of business and organizational skill they exhibit. In the most effective situations, the County Commissioners were themselves skilled in business and management affairs. They were able to provide *stable and usually supportive contracts with the FBO*. In most cases they were ready to furnish some resources-in-kind for the maintenance of the airport

such as snow removal services and other occasional assistance. Without this sort of relatively knowledgeable patronage the FBO's situation could become unstable and sufficiently uncertain to discourage the necessary entrepreneurial activities. State government, too, could provide resources which would enhance the possibility of airtransport usage. Obviously, without the initial stimulus of State funds and the persuasion of local leaders to engage in the project, the airports would not have been built with the same ease or in anywhere nearly the same numbers. The Division of Aviation's contribution in funds, technical skills and political troubleshooting were crucial. But at the time of the study the Division of Aviation had not undertaken to improve the situation of the FBO either by nurturing his skills or by providing the counties with assistance in working out supportive relationships with the airport management. Were these additional resources to be forthcoming, it is likely that continued developments of airtransport capacities would result.

Technological Diffusion Without Disruption. What is most striking about the Ohio County Airport Program is the degree to which the technology of airport facilities and low-level general aviation operations, has been diffused throughout rural Ohio, with apparently very limited social impact. This study, in contrast to most studies of technology and social change, became an examination of a process of technological development which has been almost wholly *within the adaptive capacities of the system*--the state and the communities--to adjust to and to integrate with their usual patterns of activities. The program apparently achieved its minimum objectives with minimum disruption of the social fabric of the receiving communities, and perhaps at minimum cost.

We repeat here the key elements which seem to have shaped this process of minimal disruptive technological diffusion.⁶ (1) An implementing organization which was small enough so that highly flexible internal arrangements could be sustained throughout the construction phases. This allowed opportunities both at the community and at the legislative/executive levels to be taken up quickly and with a high

degree of sensitivity to variations in local conditions. (2) An implementation strategy which encouraged the distribution of state resources in accord with local political values, and in amounts sufficiently small to limit the sheer size of each technological intervention. Governing mechanisms were developed in a way which promoted local self-regulation of the new operations, thus reducing the potential for community opposition. The manner of distribution--both the limited developments in each county and the establishment of local-self-regulation--have allowed considerable variation in the degree to which the potential for improved airtransport capacities has been realized.

Thus, the very qualities of the implementation process have acted as a built-in limitation on the potentially disruptive development of airtransport-associated industrial activities. By and large, the varied characteristics of the local communities which have resulted in little or clearly contained developments around the airport have been allowed to shape that development without further state level intervention. Thus local conditions, values and opportunities have moderated the potential rapid realization of industrial growth goals while allowing for the achievement of those goals which have the least upsetting effect on the communities.

A Concluding Speculation

While it was not our intention, this study has, in effect, explored a situation in which a technology was widely dispersed with neither dramatically disruptive nor greatly beneficial effects. Such a result is probably the norm for technological developments' influences on day-to-day experience. By contrast the development of large nuclear power plants, space craft launch complexes, rapid transit systems and huge airports, such as O'Hare and Dallas/Fort Worth International Airports, all have compelling, long term and very significant shaping effects on the communities surrounding them. Whether these effects are to be judged for the good or ill of the communities, it is indisputable that they have been a major source of change. It remains for us to speculate a bit about some of the conditions which may account for the differences, sharpened by comparing the Ohio County Airport Program with those massively change-inducing technological developments.

Three major factors seem to account for the most change within a community, region or nation as a consequence of technological development. The first two factors are related to the characteristics of new or improved technology, and the third to one characteristic of community social structure. There are other factors, of course, but the three which follow come center stage in our speculation.

The *relative degree by which a new or improved technical innovation advances the capacities of that technology* is the first factor. Technical innovation almost by definition provides a greater capacity for people to do something new or more efficiently than before the innovation was available to them. The increment of increased capacity (or capacities) may be rather small, as, for example, in the introduction of radial tires for the automobile, or the degree of improvement may be enormous as with the electrification of rural areas. Thus, a "measure" of the relative degree of technological improvements would be the absolute capacity of the new or improved technology compared to the capacity of the same type of technology available in the community at the time the new technology was introduced. A STOL runway provided in the midst of the several runways of Huston International Airport, for example, is a very small marginal improvement. The airports of the Ohio County Airport Program represented a more significant but still modest improvement over what was already available to users in our seven counties. But the introduction of Dulles International, outside of Washington, D.C., was an enormous increase in absolute and relative capacity over the crowded conditions of the smaller (though closer-in) Washington, D.C. International Airport. It should be noted that the potential capacity of the technology need not be fully utilized for it to rate as a great improvement in capability.

The importance of this factor stems from the degree to which increasing relative improvement prompts a greater variety of potential new uses and users of the technical innovation. As the degree of improvement increases, so increases the number and/or efficiency of activities not previously possible. We would expect that a large increase would stimulate more new activities than a lesser advance, and, in so doing, bring more people "under the influence" of the improved technology. As they learn the advantages of the new capacities, personal norms and interests may alter, thus having an indirect effect on other aspects of the community. A greater variety of new

interests may also bring a growing heterogeneity into the community which increases its social complexity.

One of the primary points of our discussion of technology in Chapter One was that the social organization of a technology was a crucial, often overlooked source of a technology's impact on social, economic and political experience. The second factor nominated here as a mainspring of change accompanying technological development is the *social scale of a technological development* relative to the scale of the existing community, i.e., the size and organizational complexity of the new or improved technology, the organizations dependent on it, and the size of community into which it will go. Analytically, the scale of social organization involved in the *initial* implementation of the technology may be distinguished from the scale of organization needed to *maintain* the new technical capacity. Often the social organization scale required for construction or start-up varies little from that needed to operate the new technology. But the more massive the technology, the less, apparently, this is the case. Thus, the construction phase in the development of nuclear electrical power, employing some 4,000 personnel needed for more than five years, is much reduced once the facility has been built. In any event, the size and social composition of the working groups necessary to implement and operate a new or improved technology may have important consequences for the communities to which the technology is delivered. In part, that effect is a function of the scale of the technological organization relative to the scale of the community. This may vary greatly, in Ohio the social organization associated with the new county airports was most modest compared to the counties in which they were built. Just the reverse is the case for the gargantuan organization and operations of the Dallas/Fort Worth Airport. Clearly, the greater the relative scale of technical organization, etc. the deeper and more thoroughgoing the potential impact on the community.

The third change-responsive factor is related to the communities, regions or nations which "receive" the technology with its quotient of relative technical improvement and of relative scale of operations. This factor is the *degree to which the receiving society is homogeneous and socially integrated*. Of these three factors, all of them difficult

to operationalize at our present stage of social science development, this factor is perhaps the most difficult. At one extreme the community could have many different groups with heterogeneous values, semi-autonomous groups or enclaves that have little interconnectedness or interdependence among them. At the other extreme would be the communities which are highly integrated with quite homogeneous values and norms, minimal degrees of differences between groups which are tightly knit in patterns of mutual economic, social and political interdependence. (It is likely that there is a high positive association between size and differentiation, but this is an empirical matter for later examination.)

For our purposes the importance of this factor is that the greater the differentiation of the community, the more likely it is that the effects of a technological intervention will remain relatively contained within the group or sector of its original establishment. Though the impact on the people associated with that sector is likely to be relatively greater than in "surrounding" sectors, beneficial or disruptive effects are less likely to influence groups not directly associated with the technology. In a more integrated community or society, changes which occur within a sector tend to be moderated by the influence of other groups or sectors upon which the initial sector is dependent. Thus technological development within an integrated community, such as our Ohio counties, is more likely to be relatively smoothly absorbed. However, when a relatively integrated community is confronted with considerable pressure for change, it is, in a sense, more vulnerable than a community which is highly differentiated. In communities or societies which are not tightly knit, disasters as well as benefits are relatively contained, kept within a sub-set of the community, the ripple of consequences extends only a little beyond the group that experienced the problem in the first instance. But in well integrated, interdependent communities, the consequences of strain are shared more fully by everyone. Up to a point this moderates the impact upon those initially affected. But as the absorptive capacities of the community are approached, the increased strain is distributed over the whole community

more evenly than in a differentiated one. If the threshold of tolerance is reached, the situation threatens to swamp the whole community, bringing problems of overload and potential breakdown.

Figure 11-2 presents, in simplistic schematic form, the mixture of these three factors or variables in terms of the degree of expected change stimulated by a technical innovation. The general hypothesis is that as each of these factor increases the degree of change to be expected increases as well. As the increment of technical advantage grows, so does the likelihood that more people will see it in their interests to take advantage of the technology--in ways that strain relationships within the community. If the community is relatively differentiated this is contained, but in more integrated communities, the strain is shared more generally. If at the same time the social organization of the technological program grows dramatically in relation to the size of the existing community, the impact of funds, new people, and breadth of effect increases the strain toward change until it bursts the bounds of any one sector, finally involving the whole community.

This thesis is not directly addressed in our study of the Ohio County Airport Program. Rather, it emerged in part, from subjective comparison of our results with technological programs which obviously have had gross and overwhelming influences on a community or nation. But once the thesis is stated, it raises a host of questions which require both methodological and empirical consideration. Each of the assertions about the importance and effect of increasing technical improvement, organizational scale and social integration call for a great deal more precision in measurement and clarity concept. Here, at the end of a long exploratory study, it is not the appropriate time to begin these refinements. Brief suggestions about the character of each change-related factor must suffice at this point.

The notion of differential technical capacity at the root of relative technical improvement requires formulation in social as well as purely technical terms. Methods paralleling the measurement of mechanical work, for example, will be needed, cast in terms of the degree to which the new technology's social capacities address important social

FIGURE 11-2

DEGREES OF TECHNOLOGICAL IMPACT ON RECEIVING SYSTEM

		Small		Large	
		<u>Community Structure</u>		<u>Community Structure</u>	
		Differentiated	Integrated	Differentiated	Integrated
<u>Degree of Technology Improvement</u>	Modest	<u>Least change</u> absorbed within sub-groups 1	<u>Little change</u> absorbed within community (Ohio) 2	<u>Modest change</u> adjustment among sectors 5	<u>Substantial change</u> adjustment throughout community (Jackson) 6
	Great	<u>Minor change</u> within one sector 3	<u>Some change</u> for whole commun- ity over the long term 4	<u>Great change</u> strained adjust- ment between sectors (Dallas/Fort Worth airport) 7	<u>Greatest change</u> overload and potential breakdown 8

values and preferences of potential users. This should be done with reference to social and individual experiences as well as the more familiar economic measures available at present.

As measures of these aspects of technology are refined research questions of a different order may be examined. As the increment of relative technical improvement increases, to what degree do unexpected social capacities become apparent due mainly to large amounts of improvement in capacity over the immediate past? That is, does a technical development, which in a single leap introduces great technical improvement, such as the development of the transistor, stimulate unexpected beneficial and/or harmful capacities which could not have been foreseen at the time of invention? If so, as is likely, are there regular patterns of such surprise? Another fundamental question is to what degree do similar "quantities" of improvement among various technologies prompt similar social, economic and political consequences? It is not sensible to suppose that a moderate amount of improvement in birth control technology will produce a similar measure of social effects as an "equal" relative improvement in, say, laser communication technology. This question calls for a careful examination of the social properties for "improvement" in different technological types.

Also a challenge is the assertion of the importance of the organizational scale of various technologies relative to the communities or societies into which they may be introduced. Conceptual clarification and measurement construction are equally necessary here to establish more accurately the various aspects and character of organizational scale. The absolute size and character of the work force required to implement the technology can usually be established. But this should be joined by a closer determination of the pattern of organizations that directly support and utilize the new technology compared with the same patterns for previous levels of development.

With greater precision comes the opportunity to pose sharper questions about the consequences of increasing relative scale for various technologies in terms of the similarities or differences of effect. For example, within a community, region or nation, in what ways do social

and economic consequences vary as equal increases in organizational scale occur among various technologies? Are the economic and social effects of growth in scale of, for example, energy producing technology, similar to an equal growth in the scale of rapid transit? They are likely to be rather different, and it seems possible to imagine studies not presently available which would increase our ability to predict the social and economic consequences of increases in relative scale for various technologies. It seems also intuitively reasonable to examine the relationship between changes in technical improvement and organizational scale: Is there any systematic relationship between increases in a technology's relative technical improvement and increases in its organizational scale?

Finally, a great deal of careful work is needed to develop conceptions of a society's internal economic and social structure in terms that will allow us to observe the relationships of changes in social experience following in technology's wake and other changes in norms, values, and other aspects of social and economic life. We have argued that one important characteristic is the degree to which the community or nation is social differentiated or integrated. Tested measures of social differentiation and integration, as well as other social indicators, would provide the basis for a better sense of the character of strain likely to be produced by the introduction of technologies with various levels of relative improvement and organizational scale.

Were studies based on such a perspective more readily available, they would enhance both technology assessment projects and policy development. Agencies which employ various technologies in pursuit of multiple missions--NASA, the Department of Transportation and others--have choices to make in the development of different "in-house" technologies. They also must make choices about the communities or regions into which they will propose introducing a new or improved technological development. Greater precision and understanding of the relationship between the likely social, economic and political effects of introducing technologies X , Y , or Z , characterized by degrees of relative technical improvement, X^1 , Y^1 , or Z^1 and organizational scales of X_j , Y_j , or Z_j , into

communities having different levels of development and integration would go some distance in improving the knowledge basis for the political decisions involved in the development of public technology. It is likely that in the absence of techniques of this sort or others that provide similar information, both technology assessment and policy development in technological matters will remain stunted. They will remain too heavily dependent on the techniques of systematic intuition such as the delphi methodology and other forecasting attempts. Intuition cloaked in the apparent rigor of analytic language but without social substance is both unnecessary and unwarranted. It is also a disservice to those confronted with the responsibility of making decisions.

NOTES

¹Perhaps the best summary of this literature thus far can be found in The Mitre Corporation, *Technology Assessment Methodology* (6 volumes) MTR-6009 (June, 1971).

²There is a strong and growing social research tradition which is consistent with the methodological choices employed in this study. See for example, Leonard Schatzman and Anselm Strauss, *Field Research: Strategies for a Natural Sociology* (New York: Prentice-Hall, 1973) The "symbolic-interactionists" approach in, e.g., Herbert Blumer, *Symbolic Interactionism*, (New York: Prentice-Hall, 1969) is also related to these methodological trends.

³The study reported here was shaped by the funder's objectives in a special way. NASA was concerned at the outset with increasing its understanding of the influence of air transportation on communities, but it did not have before it any particularly pressing decisions. The STOL engineering projects which were the responsibility of NASA had set them to wondering what the social consequences might be if they were successful in the technical development of STOL aircraft.

⁴See Schatzman and Strauss, *op. cit.*, for a discussion of the strategies involved in this type of "natural sociology,"

⁵In our study, a crucial step in the site selection was, as noted in Chapter Ten, a brief visit to a number of communities each of which seemed on the basis of secondary data to be about equally suitable for more intensive study. In a sense, that "start-up" stage renders our study the "pre-test" for a major study of airport assessment.

⁶Chapter Nine above included these same findings in the *particular* context. They are repeated here to emphasize the importance of thinking out degrees of social disruption potential in *any* technological development program.

METHODOLOGICAL APPENDIX

The materials included herein provide an overview sketch of the conceptual development associated with the community portion of the field study. Also included are materials supporting the discussions in the various chapters of Part III

CONTENTS

- Document A Chronology of the Ohio County Airport Program Study
- B Intermediate Re-conceptualization of the Relationships between Airports and Surrounding Communities
- C County Information Questionnaire Directed to Division of Aviation
- D I--Interview Protocol for Leading Citizens and Summary of Interviews with Leading Citizens by County and Category
II--Protocol for Door-to-Door Interviewing of Public
III--Protocol for Corporate Interviews
IV--Interview Protocol for Recreational Flyers
- E Methodological Notes on Chapter Eight

A

CHRONOLOGY OF OHIO COUNTY AIRPORT PROGRAM STUDY*

- Dec., 1972 1972 NASA Report completed. Initiated resolve to conduct empirical field study to explore feasibility of general perspective outlined therein
- Jan -March 1973 Review of possible field sites, construction of general hypotheses, briefing on Canadian experience (NORDAIR, Inc)
- March-April 1973 Selection of Ohio as field site
Visit to Columbus and the Division of Aviation (March)
- May, 1973 Preparation of "Research Overview Ohio Airport Study Project"
Re-forming of theoretical framework
Reviewing of general information about Ohio
Forwarding of "Ohio Questionnaire" to Division of Aviation (See Document "A" below)
Arrangement made with the College of Agriculture, Ohio State University for logistical assistance
- June, 1973 Immediate preparations for field research detailed review of information from Division of Aviation, Ohio census materials, etc., Travel arrangements
- June 28- July 14 Research and conferences in Columbus College of Agriculture, Division of Aviation, and Division of Economic and Community Development
- July 15-20 Visit to first community selected for study (Fayette County) and preparation of "Intermediate Reconceptualization of Relationships between Airports and Surrounding Communities" (See next page)
- July 21- Aug. 5 Study visits to five counties
- Aug. 15-21 Final interviews with government officials associated with implementing the Airport Program Division of Aviation, Division of Economic and Community Development, and past officials in Governor Rhodes' administration
- Aug. 24-27 Study visit to seventh county
- Oct. 1 Began process of data refinement and analysis
- Jan., 1974 Initiated phone interviews with aviation officials from several states and with corporate management representatives

*This schedule reflects time sequence and does not indicate the level of effort put forth at each stage, which varied from that of four full-time persons to one quarter-time person

B

INTERMEDIATE RE-CONCEPTUALIZATION OF THE RELATIONSHIPS BETWEEN AIRPORTS AND SURROUNDING COMMUNITIES

(Mid-July, 1973 The initial field experience in Fayette County, the first of seven counties visited, resulted in refinements and some shifts of emphasis within the original conceptualization broadly outlined in Chapter One These modifications were incorporated into this outline, intended to guide the field explorations in counties yet to be visited.)

I Airtransport capacities (major independent variables)

1. Physical Facilities-characteristics

a Minimum parameters

3500 feet of concrete runway able to accept aircraft up to and including DC-3 and executive jets such as the Learjet

24 VFR capability, i.e , light without instrument capabilities

Ready telephone and aircraft tie-down facilities

b Likely additional facilities

Fuel for piston engines, hangar space

Day light hours attendance and local terminal or operations building.

Airport manager

2. Operating requirements (established by the Division of Aviation)

a County or city responsible for maintenance of runway, mowing sides, weeding, and care of access road There is also an implicit requirement to encourage airport management.

Thus, physical and minimum operational capacities make available following capabilities

Transient facilities or locally based facilities without fuel
HOWEVER, if there is a "Fixed Base Operation" then the following capacities are possible

3 Twin capacities for

Local recreational opportunities for citizens and local notables
That is, stop-over for out of towners, local flight activities, instructional activities with full or part-time instructor, local flying associations, fly-ins, charter and sales activities

Corporate travel either locally based or transient "stop-over" use.
That is, basic facilities (fuel tie-down, flight planning), radio contact, instrument let down facilities, maintenance, and local base of operations This would be used as access to branch plants and/or point of origin for sales and coordination activities

B, 2

II Variables affecting degree to which capacities are utilized

(Note These can be seen as related to two phases, initial and consequent, of the airport development program. While we are interested in both phases, attention to them is split in two groups, the community impact aspects and the developmental activity stimulated from the State, i e., The Division of Aviation)

- 1 Influences from Governmental Agencies (that do not use facilities directly)
 - a State/Federal regulations (Div. of Aviation, Division of Economic Development)

Enabling effort in operation, consequent facilities development, of economic development (industrial recruiting, etc.)
 - b. Local governmental/political responses to activities

Since minimum facilities had been established (especially note distinction between airport as issue or airport as project for the community

Relation of "Airport authority" to manager and to State level, especially the character of the "board" generally either County or Airport Authority appointed by county.
- 2 Influences of local groups of public (that do not use facilities directly)
 - a Local public sentiment for development (both in general and with specific reference to airport (note sentiment at initial time as well as its change)
 - b Sentiment of local notables with reference to flying (favor, neutral, think it's foolish), groups such as Rotary, Kiwanis, corporate executives, and degree of contribution to facilities

III Social and Economic Aspects of Airtransport Use (level of activity)

- 1 Private/recreational use (mainly directly consummatory)

Flying lessons, plane rental, stop-overs to see friends, local flying clubs, and gatherings, fly-ins and competitions, charter and sales.
- 2 Corporate Use (in and out use, and local base)

Use as a function of management and production operations both from local base and from the outland to the branch. Logistics, coordination and sales. Information exchange and control activities.

B, 3

IV. Character of Local Impact

- 1 Social impact of private/recreational activities through the people involved

Flying becomes more popular, town sees itself in a new spatial perspective.

Local elites re-configure around flight activities, provides a status differentiator, elite contact with new outside groups via fly-ins etc

- 2 Economic and Corporate Behavior (two step process)

- a. Changes in corporate uses of airtransport which impact locally changes in frequency of use at existing plants (Character of that use, i.e., for what purpose)

Has there been use which transfers activity from ground transport to airtransport or the reverse?

To what degree has airtransport as a convenience become seen as a relative necessity? To what degree would cessation of airtransport capacity change behavior of corporate people, in what manner and at what economic and social cost?

- b. Changes in the overall corporate use of airtransport-for whole operation

Change in local branch operations or local environment which prompts use of airtransport new relations to headquarters, plant expansion and new demand, new locations Airport use as adaptation to new demands

- c. Overall pattern of local level of air related to non-air related industry

Character of workforce, size, type of industrial or service activities.

Character of ownership, local, absentee, etc.

V Public Issues (projects) and response related to airport or industrial consequences

1. Emergence of Issues (if any) in initial or consequent phases

Employment/welfare, educational problems, housing, sewers and water, economic development as an issue (rural vs metro), quality of local leadership.

To what degree do local issues become "projects"

B, 4

- 2 Collective community responses to alter the situation, if any .

Issues in general - approach county, state, federal agencies
 Direction of approach, executive, legislative and/or judicial

Airport development per se re taking up further opportunity made
 available by the Division of Aviation

VI. Character of Consequence of collective response (if any was to be had)

- 1 To what effect in local behavior regarding economic development/
 airport development
- 2 To what effect in state/ederal response regarding economic devel-
 opment and/or airport development per se

VII Consequent political response after initial developments

1. Attitudes of political officials and citizens toward
 further (continued) development of airport activities (booster,
 neutral, why make further changes)
 further town developments (same scale as above)
2. Leadership patterns of existing and/or new elites
 (status quo, tension between old/new, integration of old into new,
 domination of old by new)
- 3 Changes in the degree local control over factors affecting the
 community has altered, e g , removal of plants, expansion, etc
4. Changes in the locally available resource base for addressing
 public problems resources in taxes and people strained, un-
 changed, enhanced in relation to new level of demand

COUNTY INFORMATION QUESTIONNAIRE DIRECTED TO DIVISION OF AVIATION
(Spring, 1973)

(Once Ohio was chosen as our field site, we faced the problem of choosing a handful of counties to study in detail from among the many in which airports had been built. An obvious source of readily available information to assist us was the Division of Aviation itself, with which we had had personal contact. The following questionnaire was sent the Division. The logic of choice reflected in it may be compared with the final criteria explained in the text of Chapter Two.)

Screening Information
Ohio Airport Project
Summer Study, 1973

C

The following questions relate to the conditions and background for each of the several counties receiving assistance in the Ohio Airport Project. The counties listed below include all those in which airport work under Phase I had been completed prior to 1971. We tried to develop a format which would require a minimum of effort. All that needs to be done is to indicate the number of the response which seems most appropriate for that question and for each county. Enough space is left in each section for you to include additional questions and responses if you think we have missed initially-important aspects.

Initial screening Cross out any county which is essentially urban and metropolitan. No further consideration need be given them.

Information about the Airports

- 1 Minimum airport facilities required.
 - 1 Upgrading existing air strip
 - 2 Relatively straight forward construction of new facility (site level, no extensive grading or filling, no special construction problems)
 - 3 Relatively difficult construction of new facility (Needed grading and filling, special problems in construction)
- 1a If up-grade of existing facility, what was the level of use prior to up-grading
 - 1 not much
 - 2 some
 - 3 quite a bit
- 2 Adjacent transport near selected site
 1. Very little other facilities (not near freeway, well-traveled roads, or railroad)
 - 2 Near major facilities (railroad, improved roads)

C, 2

- 3 Extent of commercial, industrial development already existing at time of initial airport work
 1. none
 2. some
 3. quite a bit
- 4 Present level of development
 - 1 none
 - 2 some (at least one factory)
 - 3 quite a bit (several, 3-4 factories)
 - 4 Airpark-industrial park development (several factories with plans for more)
5. Special Problems in communities at the time of initial development (list more than one, if appropriate, pass over if inappropriate)
 - 1 Unemployment
 - 2 Union troubles
 - 3 Population decline
 - 4 Other (Specify)
 - 5 ----
 - 6 ----

COMMUNITY RESPONSE

- 6 Initial source of development proposal
 - 1 Came from county
 - 2 Initiated by Aviation Division personnel
- 7 In addition to Phase I funding (\$100,000) communities needed
 - 1 Very little funding
 2. An additional \$10-\$40,000
 3. An additional \$40-\$80,000
- 8 Community-accepted agreement to do airport
 - 1 Before industry agreed to locate near town
 - 2 Along with an agreement with an industry to locate near town
 - 3 As a consequence of demand from industry that airport be built near town
 - 4 Don't know

C,3

- 9 Development and construction of airport facilities
 1. Went according to plan (almost no surprises)
 - 2 Went pretty much according to plan (just a few problems)
 - 3 Encountered a number of unexpected problems and surprises
- 10 Amount of assistance the Division of Aviation was required to give
 - 1 Not very much assistance
 - 2 Some assistance
 3. Quite a lot of assistance
- 11 Community (county) leadership at time of initial proposal was
 1. Not very capable, and divided
 - 2 Not very capable, but cooperating
 3. Quite capable and divided
 4. Quite capable and cooperative
 - 5 Don't know
- 12 Community leadership at present is
 - 1 Not very capable, and divided
 - 2 Not very capable, but cooperative
 - 3 Quite capable and divided
 4. Quite cooperative and capable
 5. Don't know
- 13 Other sources of funds included
 - 1 Phase II funding
 - 2 Used federal funds as well
 3. Private contributions

INDUSTRIAL RESPONSE

- 14 Case in which new industry decided to move in before sewer and water facilities were actually in place (Mark X in only those instances where it did happen)
15. Amount of selling necessary to get industry to locate near town
 - 1 Was relatively easy to obtain industrial agreements
 - 2 Took lots of effort to get industry to locate
 - 3 No industry has come in
 - 4 Don't know about effort required

C, 4

16. Industry's present level of satisfaction with new location

- 1 Quite satisfied
2. Moderate satisfaction
- 3 Somewhat unsatisfied
- 4 Have left
- 5 Don't know

OVERALL EVALUATION OF PROJECT

17. County effort was

- 1 Very successful (industry developed, community thriving, leadership has learned to work together)
- 2 Successful (industry developed, community better off, leadership sometime works together)
- 3 Somewhat successful (industry developed, community pretty much the same)
- 4 Not very successful (only limited industrial and recreational development)
- 5 Project was not successful (no industry, leadership did not learn much)
- 6 Other categories (specify)
- 7 ----
- 8 ----

18 List counties that you judge had a chance to receive assistance from project which did not--that is, instances which are failures in terms of the objectives of the project,

FIELD STUDY INTERVIEW PROTOCOLS AND QUESTIONNAIRES

Reproduced below are the questionnaire formats used in the Ohio field study. Respective formats were used for the leading citizen, mass public, corporate, and recreational interviews. It needs to be emphasized that in every case these interviews were open-ended and not tightly structured. The series of questions shown here served as primary guides to the interviewers, but individual circumstances often dictated additional or variant questions, especially for the interviews with leading citizens and recreational flyers.

D-I

INTERVIEW PROTOCOL FOR LEADING CITIZENS

I. BACKGROUND INFORMATION

- 1 First I'd like to get some background information on the community and its government, and about your own activities. Let's start with your own activities.
 - (1) What does your job as _____ involve?
 - (2) How long have you been at this (job, activity, position)?
 - (3) How long have you been in this town?
- 2 Now I'd like to learn a bit about the county government.
 - (1) What are the general responsibilities of the commissioners?
 - (2) What sorts of recent projects have they been engaged in?
 - (3) What about the individual commissioners? (seek information on backgrounds, affiliations, reputations, tenure, etc., if conversationally feasible)
 - (4) What sorts of activities does the county carry out with other counties? For example, regional planning exercises?
- 3 Now what about economic activities?
 - (1) Is farming or business the main activity here?
 - (2) What are the main industries (farm projects)?
 - (3) Is the work force unionized?
 - (4) Is there a Community Improvement Corporation? In what projects has it been involved? (get details on projects and industry location efforts)
 - (5) Some rural counties find that there is a 'youth drain' of people who leave after high school and don't come back. Has that been a problem here? What can be done about it?

D-I, 2

- (6) Does it seem like a few corporations with headquarters elsewhere have too much power? (This sometimes happens in small towns)
- 4. What do you think the main problems now facing this county are?
- 5. Now what about social activities?
 - (1) Often in small towns it turns out that persons who are not on the official organization charts nonetheless are very important in civic affairs Are there such persons here? (Who are they?)

II AIRPORT INFORMATION

- 1. Now I'd like to turn to the airport itself, and ask about the airport and its relation to community life .
- 2 Do you know of any companies that use the county airport? (get details as possible)
- 3 Do you know of any recreational fliers who use the county airport? (get names for future reference at least, stories and other information if possible)
- 4. What can you tell us about any special events, like fly-ins, that have occurred at the airport? Have you been to or helped sponsor any of these?
- 5 Do you know if other airports nearby compete with this one as an alternative for recreational fliers or corporations? What airports? Any specific instances?
- 6 How is the airport organized and run? That is, what is the division of responsibility for overall and day-to-day running of the airport?
 - (1) What role do the commissioners play?
 - (2) What roles does the Airport Authority play?
 - (3) Has the cost of the airport operation presented a problem to the county?
 - (4) Any other problems? (zoning, safety, etc.)
 - (5) Does it seem to you that the airport has been important in drawing new people to live and work in this town? Which groups, companies, people?
 - (6) What can you tell us about the financing of the airport? Is the tax problem significant? Who pays for regular maintenance? Is the FBO self-supporting?
- 7. What about the effects of the airport project on social activities?
 - (1) Do you think the history of the airport project has substantially

D-I, 3

changed the positions of particular citizens or groups? (e g , made some persons newly prominent, discredited other persons, or reinforced others?)

- (2) Are there any particular groups (clubs, cliques, political groups, etc) that have taken an especially active interest in the airport? What ones? What have they done?
- (3) How do you think people generally--the 'man on the street'--feel about the airport?
- (4) Does it seem like the airport program has made people think more about areas outside their local surroundings? That is, has the increased transportation or the increased contacts necessary to building the airport broadened people's geographic outlook?

8. Now let's look some more into the history of the airport project ..

- (1) On what basis was the airport program presented to the community by the state? (safety, economic development, recreation, what?)
- (2) How did people feel about those claims, those projections?
- (3) How was the initial money raised? Who were the major contributors, who helped organize the fund-raising? Were there special problems in arranging the financing?
- (4) Were there any special problems in the construction process, or did it stay pretty close to the estimated costs and schedules?
- (5) Who were the people who initiated the airport program? What did they do? Are they still active in the program?
- (6) The state government changed hands in the middle of the program, do people feel that has made a difference to the conduct of the program?
- (7) Were you involved in the airport project? With whom did you work most?
- (8) Has the airport turned out the way you thought it would?

9 What do you think about the future of the airport? What problems and opportunities do you see arising in, say, the next five years?

III OTHER

- 1 Just as a check on ourselves, are there other topics you would like to mention, or questions you'd like to ask us?

D-I, 4

NUMBER OF LEADING CITIZENS INTERVIEWED BY COUNTY AND CATEGORY*

	(a) <u>Airport</u>	(b) <u>Public</u>	(c) <u>Business</u>	(d) <u>Social</u>	<u>Total</u>
Fayette	3	6	5	2	16
Hardin	4	2	3	1	10
Holmes	3	3	2	2	10
Jackson	7	4	2	3	16
Knox	3	6	2	2	13
Vinton	2	2	-	-	4
Williams	2	2	1	1	6
<hr/>					
Total	24	25	15	11	75
<hr/>					

*Each person assigned to only one category by definitions given below.
Several persons had important functions in more than one category.

- (a) FBO's, FBO employees, former FBO's or FBO candidates, Airport Authority officials, flight instructors (FBO interviewed in every county)
- (b) County commissioners, mayors, planning commission officials, agricultural extension agents.
- (c) Leading businessmen, farmers, and/or Chamber of Commerce officials
- (d) Ministers, newspaper publishers or editors, and retired prominent businessmen

D-II

PROTOCOL FOR DOOR-TO-DOOR INTERVIEWING OF PUBLIC

(Introduce self and project briefly, ask occupation of interviewee, estimate sex and age of interviewee)

- 1 Sex of Interviewee
- 2 Age of interviewee (estimated by interviewer)
- 3 Have you ever been to the _____ County Airport?
 - (a) If YES Did you go there to go flying?
 - if NO What did you go there for? (Curiosity, some public event, fishing use the part, etc.) [Then Question 4]
 - if YES Do you yourself know how to fly a plane? [Then Q. 4]
 - if NO: Do you plan to learn some day? [Then Q. 5]
 - (b) If NO Have you ever heard about it or read about it before now?
 - if NO end of interview
 - if YES Do you know anyone who uses the airport? (get names of persons known and reasons for use, if possible) [Then Question 5]
- 4 Is the airport satisfactory for your purposes?
 - If NO: What might be better?
5. Do you think the airport has been a good thing or a bad thing for the community? Why? (Alternatively What difference do you think it would make if the airport weren't there?)

Summary of survey procedure Arbitrary choice of residential street in County Seat, every house tried in sequence until time no longer available (as determined by rest of interview schedule), no recalls for not-at-homes
In short, a very informal survey

SURVEY PARAMETERS

Counties: 4
 Persons Interviewed: 35
 Not at Home. 23
 Refused Interview 7

D-III

PROTOCOL FOR CORPORATE INTERVIEWS

I INTRODUCTION

Brief explanation of what the research team is doing, who we are and why we are talking to the particular person

Let the person ask any questions on this before going on

II BACKGROUND ON BUSINESS OPERATIONS

First, I'd like to ask some questions to get an idea of the business you manage (help operate)

- 1 What products (services) do you make (perform)?
For whom? (direct consumption by external market or other parts of same organization)
- 2 About how many employees are at this facility?
3. Are they mainly skilled or semi-skilled?
- 4 How many management and professional people are located here?
5. Do most of the people working in this facility live in town? Do many commute from out of town?
- 6 Does your business sell mostly to firms (customers) out of town?
Where do you get your own raw materials, supplies and services?
- 7 Are there other branches of this firm? Where is the main office?
8. Is the local operation more or less directly tied to the home office or is it somewhat autonomous?
- 9 How long has this facility been at this location?

III RELATION TO AIR TRANSPORT

Now I'd like to ask a few questions about how the firm uses air transportation

- 1 Do you, yourself, have much occasion to use air travel for business activities? About how frequently?
2. Could you give me some examples of the kind of thing air transport is used for in your own business activities?

(Write up each example separately in as much detail as is possible)

3. Do other people in this firm use air transportation for business

D-III, 2

purposes? Who? About how frequently? Could you give me some examples?

(Write up separately, in detail)

- 4 How does the home office seem to use air transport in its operations?
- 5 In what ways does this air transport capacity in the home office affect your operations here?
- 6 In general, what difference does air transport make to your operations here? That is, if you couldn't count on getting an airplane in and out of the local airport, what things would you be doing differently?
- 7 How much of a change would that make in the way you do things?

(Probe for statements of the value of air transport to them)
- 8 Are you or any other employees of this firm a recreational flier?
- 9 Have you followed the development of your local airport very closely? If so, were you involved in that development? How did it work out?
- 10 How well does the county seem to manage things out there?
- 11 If things were brewing that might change the facilities or services out there, would your company be likely to get involved in any way? If so, how would you go about it?

D-IV

INTERVIEW PROTOCOL FOR RECREATIONAL FLYERS

Introduction

Brief Discussion of Project Aims

- to clarify the ways in which those involved in general aviation interact with each other and represent a unique social group
- to discover how general aviation has affected the life styles of those involved

Are there any questions which I could answer?

Get the following information

Name
Address
Approximate age
Who in family flies
Employment in family
Marital status

I contacted you because I knew you

were taking flying lessons
have your pilot's license
used to fly pretty regularly

1. Could you please tell me why you first got interested in flying and how you would describe your current interest in it

who interested you

Have you maintained same enthusiasm as at the beginning?

Why did you start when you did (not earlier or later)

2. How frequently have you been taking lessons and how many hours do you have now?
3. How frequently did you take lessons, are you still taking lessons, and how often? How many hours flight time now?
4. What are your aspirations regarding flying? Do you plan to study further-why?
5. Do you or did you ever rent a plane? Could you tell me what the decision to rent was like?
6. Do you own a plane or plan to buy one? When & why? If owned, how do you like having one?

D-IV, 2

7. Did you ever own a plane and sell it without getting another one?
8. How frequently do you (did you) fly and for what sorts of purposes?
9. Do you (did you) like to fly alone or with other people? Who in particular?
10. Where do you like to go when you fly-local, get together, inaccessible places, etc. Could you talk about what is most outstanding trips you've taken and what you usually do.
11. About how often do you fly and how long are your trips?
12. I guess there are always some tensions regarding time and money for flying as opposed to work or other recreation. Could you talk a bit about this aspect of your flying.
13. How does your family react to your interest in flying? Do they join you, study or plan to study?
14. Have you tried to encourage your spouse and/or children to take up flying--what happened?

What is your wife's attitude toward flying? do you think it's important for your son, etc.? If anyone has taken up flying how far does he/she plan to study?)
15. Could you discuss your overall family interaction regarding flying. Has it changed your interests, family schedules, etc much?
16. Do you ever use planes for business? Explain. How important, how often
17. Have you made any business contacts through flying recreationally? Explain
18. Do you attend any special functions related to flying--shows, contests, fly-in? What, where, who participates, what part do you take?
19. Would you or your family and friends have gotten as involved with flying without having a county airport nearby? Explain
20. Have you made any local friends (new) and acquaintances through flying that you might have not met otherwise. Who, on what basis, friendship at airport or outside? Do families interact at all or only 1 to 1?
21. Have you made any friends in other places through flying? Why-How? What basis, how frequently do you see each other, do families interact?

D-IV, 3

- 22 Do many of your best friends fly? Did they start first, or you get them interested? Do you do things re flying together? Do you sense that you are friendlier since you've both been flying?
23. Of your friends who don't fly--did you try to interest them in flying? Do you interact less frequently than you used to? How do you think they feel re flying (jealous, indifferent, casual interest)?
- 24 Do you read aviation magazines regularly? What special subjects interest you? Do you try to keep abreast of latest planes and other technology related to flying - what interests you?
25. What is the current and future role of flying in the US? Do you see flying as a necessary skill?
- 26 Do you see the experience of learning to fly and flying as a valuable part of personal development (self-confidence, etc.) Do you regard becoming a pilot as an accomplishment - was it easier or harder than you expected?
27. What about your tendency to be involved with other recreation - family, motor hobbies etc. Has flying been unique in your life in this respect?
- 28 How do you feel re your local airport? Is it adequate, need specific improvements, too quiet, what would you like to see done?
29. Is the manager's personality and involvement important in the airport operation?
30. Were you involved in getting the airport going? How? What history do you know of?
- 31 How do things get done around here to improve the airport? Who has to approve? Is there an airport authority? Pilot's association? What are their roles? aims, etc ? Are you involved? Why do you think improvements happen or don't happen?
- 32 Are there any special stories re use of airport for health, education, charity, etc that you know of?
- 33 To finish things up could you talk a bit about what flying means to you How does it make you feel, etc., if there's anything you haven't touched on yet
- 34 Are there any people in particular that I ought to speak with for any special reason?
- 35 Is there anything more you'd like to ask me regarding the project?

E

METHODOLOGICAL NOTES ON CHAPTER EIGHT

The survey of recreational flyers reported in Chapter 8 was an exploratory attempt to introduce anthropological perspectives into a technology assessment effort. In this attempt we confront two types of problems requiring special mention. the first methodological, the second a problem in the organization of relatively disparate data.

Methodological Limitations of the Survey

The methodological demands of this perspective are stringent and, due in part to time limitations, these demands could not be fully met. Thus, there are several notable limitations of the survey which should be taken into account.

Special Qualities of Ohio and Its Rural Communities. Ohio was historically settled and developed more compactly than the western and southern regions of our country. Today there is probably relatively little need in Ohio for long distance travel for common social activities. Since the state has several large cities which can easily be reached by an excellent highway system from all of the rural communities we surveyed, the importance of flying as a form of personal transportation is not as great as in other places. But because Ohio lacks the mountains, large lakes, and other geographical features which enable other forms of recreational activities to be stressed, flying is a particularly attractive form of recreation in Ohio.

Scope of the Sample--The sample covered only those people whom we could identify as presently active in recreational flying. There was no coverage of "potential flyers," those individuals who might have taken up recreational flying had it not been for constraining factors such as limited funds, lack of information about flying opportunities or training facilities at the local airport, insufficient self-confidence, or opposition to flying from within the family. Neither were there any "ex-flyers" in our sample. Very little was learned about the reasons flyers "drop out." Were there feasible means of including representatives of these two groups in a study, a fuller understanding of the rural flyers' sub-culture could develop. Finally our sample was clearly limited to rural communities in Ohio; thus its findings are limited in generalizability, for the sample did not include certain segments of urban "white collar" workers.

The Concept of Sub-culture

The study of any sub-culture over four man-weeks of effort across five different communities is far too limited for anything more substantial than a most exploratory study. Obviously a great deal more time and resources is necessary for the depth sufficient to win much confidence in our findings. More time than could be expended here is required for the researcher to understand the norms of each community sufficiently well to assess the type and extent of deviancy of a particular group within it from the community-at-large. Without such an in-depth understanding of cultural norms any picture of a subculture is subject to some confusion and limited interpretation.

E₂

Finally, there is a possibility that a rural recreation flying "sub-culture" is less identifiable than its urban counterpart would be. Rural flyers tend to know each other in other community interactions besides flying, whereas urban flyers, having few contacts with each other away from the airport, may comprise a more distinct subculture

Meanings of Responses

Interpretations of the data in surveys such as this must be concerned with how precisely the respondents report their perceptions. Gauging the meaning of various answers to our questions required considerable insight into the process of interviewing. Because there is no simple way of assessing how well a respondent is able to probe his own thinking, responses to questions, particularly to those about the "meaning of flying," were likely to be colored by many of the respondents' perceptions of cultural norms and expectations. In an effort to facilitate this often somewhat difficult probing, we tried to provide a flexible interviewing context. (See the informal interview protocol included above as Document "D-IV.") The hazard here was that in using a relatively loosely structured set of questions in a face to face situation some respondents may have been tempted to respond in ways they thought would please the interviewer. Finally, there is always the problem in these surveys of interviewer-stimulated bias. In our case because the principal interviewer was a woman, we must consider the possibility that some responses may have been different from what they would have been had they been asked by a male interviewer (though we don't know how.)

Data Coding and Classification

To assist us in organizing an interesting but disparate body of data an Index was developed based on the categories derived from the data. Additional details pertaining to the data collected about recreational flying and the construction of the scale follow here.

*Organizing data**--Data from our loosely structured interviews were carded into the following general categories:

1. Who are the flyers?--basic data
2. Impetus for flying
3. Aviation Activity Learning
4. Aviation Activity Flying
5. Aviation Activity Access
6. Flying-Related Activities
7. Personal Meanings of Aviation
8. Social Meanings of Aviation
9. Business-Related Meanings of Aviation
10. Family-Related Meanings of Aviation
11. General Impacts

For categories 1-6 coding was a fairly simple task of extrapolating from the notes of narrative interviews. Coding categories 7-11 was more difficult, it was necessary to look for key phrases or expression of meanings in other contexts. (For example, a response like "likes to try new

* The details of code construction and classification are available from the senior author upon request.

E, 3

things--self teaching" was coded as "Challenge" and "Extended Education" within the "Personal Meanings" category, "Can drift off mentally while flying and work out ideas for manufacturing inventions" as "Enables Creativity." We encouraged our respondents to supply multiple answers to the question pertaining to meanings and impacts. Direct phrases were entered as a device for avoiding overly-simplistic categorization, thus pointing up the incidence of multiple meanings. Variations within the categories described above were used to place a particular subject in perspective vis-a-vis his community and other respondents. Ratings on the scales were cross-checked several times to strengthen the likelihood that each respondent was properly placed. Thus considerable judgment was applied in the process of synthesizing a broad range of diverse interview responses.

This coding procedure is, admittedly, at variance with the standard survey design practices of determining all categories as initial steps in questionnaire development. However, it proved to be more effective for our needs to let the categories and strengths of impact emerge from each respondent's natural choice of vocabulary and emphasis.*

Development of the SER Index Scores

Data from each respondent was also reviewed for indications of Rural/Urban Orientation (most rural=1, most urban=9), for Economic Situation (lowest=1, highest=9), and for Social Role in Community (unskilled worker with minimal education, no community involvement and no "prestigious family status"=1, well-educated professional with much community involvement and/or high "family prestige"=15). The distribution on the latter index was primarily between 4 and 14, thus paralleling the 1-9 scale for Economic situation; and a Social-Economic Index was derived by combining scores on the "Economic Situation" and "Social Role in Community." Scores of individual respondents correlated well with Rural/Urban Scale assignments, except in a few cases where the lack of correspondence was circumstantial. For example a well-off small businessman who was born and raised in town and is active in civic affairs but who rarely leaves the area and who had few or no friends, relatives or business contacts in larger cities would be expected to have a high social-economic rating and a lower rural/urban score. The Rural/Urban Scale was given weight equal to those for the Social Scale and the Economic Scale. The three values when added together yielded a Social-Economic-Rural/Urban (SER) Index.

Each subject received an SER Index score. These scores vary from 7.5 to 29.5 with a median of 22, and a mean of 20.7. (See Table E-1 for distributions). The subjects were then divided into 4 SER groups based on scores. Group 1 25-29.5, 12 members, Group 2 19.5-24.5, 12 members, Group 3 13-17.5, 11 members, Group 4 7.5-9.5, 2 members. (The larger number of persons at the upper end of the Index is consistent with the fact that flying is an expensive hobby and that more people in higher socio-economic brackets can deduct all or part of their flying as a business expense.) Subsequently, for analytic purposes we reduced the

* As discussed in Chapter 11, this approach is favored by the sociological tradition known as "natural" or ethnomethodological sociology.

E, 4

TABLE E-1

SER INDEX
SCORE DISTRIBUTION

	S	E	R	SER Index
GROUP I (HI)	7 5	14.0	8 0	29 5
	8.0	14.0	7.5	29.5
	7 5	14.0	7 5	29 0
	7 0	13.0	9.0	29 0
	7 5	11.0	9 0	27 5
	7 0	13 0	7.5	27.5
	7.5	12.0	7.5	27 0
	7.5	10.0	8 0	25 5
	6.0	12.0	7 5	25.5
	8.5	10.0	7 0	25 5
	7.5	11 0	7 0	25 5
	8.0	10.0	7 0	25 0
	6 0	12.0	6 5	24 5
	6.5	11.0	6.5	24 0
GROUP II (MID)	7.5	9 0	7 5	24 0
	7 5	10 0	6 0	23.5
	6 5	12 0	6.0	23 5
	6.5	10 0	6 5	23 0
	6.0	11 0	5 5	22.5
	7.0	8 5	6.5	22 0
	7 0	9 5	5 5	22 0
	7 0	6 5	7.0	20.5
	7.5	8 5	4.0	20 0
	6.5	8 5	4 5	19.5
	5 0	7 5	5.0	17.5
	5 5	7 5	4.5	17.5
	5 0	7 0	4.5	16.5
	5 0	6 5	4.5	16.0
GROUP III (LO)	5 0	6 5	4.0	15.5
	5 5	6 5	3.0	15 0
	4.5	6 0	4.0	14 5
	6 5	6 0	2.0	14.5
	4 5	5.5	4.0	14.0
	4.0	5 0	4.0	13 0
	4.5	5 5	3.0	13.0
	3 5	3.0	3.0	9.5
	3 5	2 5	1.5	7 5

E, 5

categories from four to three groups of approximately equal size. HI= Group 1, MID= Group 2, LO Group 3 and Group 4.

Once the SER Index groups were assigned a review of who was in each category was made. Assignments were spot checked and "confirmed" by a second researcher, who was present at almost half of the interviews.

Distribution of Responses

Personal Meanings of Flying As many meanings as respondents chose to note were recorded for what flying meant to them. These, as well as any others mentioned in other parts of the interviews, were coded for purposes of analysis. A tabulation of the number of responses made by persons in each SER category is summarized in Table E-2.

TABLE E-2
DISTRIBUTION OF EXPRESSED PERSONAL MEANINGS BY SER GROUP

No. of Responses	<u>SER GROUP No. of Respondents</u>			
	HI	MID	LO	TOTAL
1	0	1	0	1
2	1	5	3	9
3	2	1	1	4
4	4	3	2	9
5	1	1	3	5
6	2	0	1	3
7	1	1	2	4
8	0	0	1	1
9	1	0	0	1
<hr/> TOTAL	<hr/> 12	<hr/> 12	<hr/> 13	<hr/> 37

The total number of discrete responses made for each category was then calculated. For example, if two persons with SER=MID gave three answers each and one gave one answer, the total number of answers for the MID category would be seven. From this total the average number of responses per person in each category was computed and summarized in Table E-3.

TABLE E-3
AVERAGE NUMBER OF EXPRESSED MEANINGS PER PERSON BY SER GROUP

SER	Total Responses	No. of persons	Avg/person
HI	57	12	4.75
MID	38	12	3.17
LO	60	13	4.60
	<hr/> 155	<hr/> 37	

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